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DIESEL RAILWAY TRACTION SUPPLEMENT

The September issue of THE RAILWAY GAZETTE *Supplement, illustrating and describing developments in Diesel Railway Traction, will be ready on September 2, price 1s.*

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IMPROVING LONDON'S TRANSPORT

A publication of The Railway Gazette describing the new works schemes of the L.P.T.B., the L.N.E.R., and the G.W.R.

With a foreword by

The Rt. Hon. Lord Ashfield of Southwell

62 diagrams and maps, 97 photographs and folding plate

THE RAILWAY GAZETTE
33, TOTHILL STREET, WESTMINSTER, S.W.1.

Next International Railway Congress?

IT may be recalled that, when the International Railway Congress Association resumed activities in February last, by holding a meeting of the Permanent Committee in Brussels, it was announced that an invitation had been received from the Swiss Government for the next Congress of the Association to be held in Switzerland in 1947, and that this invitation had been accepted. Since then we have heard no further details, although less than a year has to elapse before the summer of 1947, when such a meeting might reasonably be expected to take place. In all the circumstances, we feel that the organisers would be wise to defer the holding of this Congress to give more adequate opportunity for preparation. The International Railway Congress Association has as its objects the organisation of congresses at more or less regular intervals, and the publication of bulletins dealing with every phase of railway management, operation, engineering, finance, and law. Thus, it has no immediate tasks which require settlement within a given period (like the Timetable Conferences), and therefore there is nothing to be lost, and everything to be gained, by reasonable deferment. The desire of the Swiss Government to get into its stride with foreign visitors as soon as possible is understandable, and its kindness in extending the invitation we believe to be appreciated widely. On the other hand, we feel that the objects of the association will be best achieved by allowing more time for transport rehabilitation throughout the world, and the preparation of papers in the light of such post-war experience. The last congress was held in Paris in 1937, and the previous one in Cairo in 1933. For the foregoing reasons, and having regard to the unsettled state of Europe and the difficulties overseas delegates would have in travelling, we think the Congress should not be held earlier than 1948.

* * * *

Major Oscar Loewenthal

The death of Major Oscar Loewenthal, C.B.E., deprives the South American scene of a figure whose biography, published elsewhere in this issue, is reminiscent of the age in which he lived. When he commenced his railway career towards the end of the last century, British enterprise overseas was entering one of its most spectacular periods. In those days, young engineers, of whom Loewenthal was an outstanding example, were at liberty to roam the world at will, unhampered by innumerable government restrictions, and in the course of a very active life he built and administered railways in Mexico, Brazil, Chile, and Argentina. Nowadays, world tendencies towards State ownership and nationalism as a political and economic creed have stripped railway pioneering overseas of most of its glamour. The young railwayman of today is as full as ever of the zest for adventure, but he starts life with his future secure from the cradle to the grave, and such conditions are not conducive to lives as full as Loewenthal led. His biography is an impressive record of the halcyon days of unrestricted private enterprise and one more reminder of the immeasurable benefits conferred on the republics of South America by British capital.

* * * *

Mr. H. M. Proud

Just over 40 years ago the signalling industry in this country took up the application of track circuit signalling to electric railways. A period of new development opened, during which it left the mark of its enterprise and skill in many countries and produced numerous excellent designs and systems. In that work, Mr. H. M. Proud, since 1932 Chief Commercial Engineer, Westinghouse Brake & Signal Co. Ltd., whose retirement we record, and of whom a portrait and biography appear in this issue, has played a distinguished part. The study of traffic requirements, the application to them of sound signalling principles, the selection of the most suitable equipment and the engineering details involved in its installation, these and the numerous associated activities have enabled Mr. Proud to acquire an exceptionally wide experience and comprehensive knowledge of his profession, and have won for him a high regard on railways in many parts of the world. He has carried the credit of British signal engineering to distant parts, and has sustained it with

ability and zeal at home. In the Institution of Railway Signal Engineers, the chair of which he held in 1937 after having served on the council for 17 years, his opinions have never failed to command respectful attention; and it is the wish of his many friends that they may yet long be heard there.

* * * *

Mr. M. G. Tweedie

Regret will be felt in signal engineering and railway operating circles, not only in this country but in many parts of the world, at the news, recorded elsewhere in this issue, of the death on August 21, at the age of 62, of Mr. M. G. Tweedie, for over 21 years Honorary Secretary of the Institution of Railway Signal Engineers. It was in February, 1921, that he was appointed to succeed Mr. W. H. Cotterill, and he at once proved himself a zealous servant of the Council and members. The membership increased considerably during his long term of office, and the numerous activities of the Institution, both technical and social, including many successful summer meetings, here and abroad, involved a great amount of work for him, which he performed with unfailing cheerfulness and care. Early in 1939 he suffered a grave breakdown in health and for the last year or two had been very seriously ill. The services which he rendered to the Institution, and through it to the whole signalling profession, cannot be underestimated. They have been of permanent benefit and their effects will endure. Until his health failed, only on one occasion, we believe, was he absent from a meeting where his attendance was required, a remarkable record. Signal engineers throughout the Empire and even elsewhere, as well as all those whose duties bring them in contact with signalling, owe him a lasting debt and must ever hold him and his work in grateful remembrance.

* * * *

Home Railway Traffic Receipts

Home railway traffic receipts for the four weeks to August 11 made a better showing than hitherto this year. The aggregate receipts for the four weeks were lower than those of the comparable period of 1945 by only £257,000, or 0.7 per cent. The latest receipts cover not only the first full month of the higher rates and fares, but also the peak of the holiday expansion of passenger traffic. The holiday period, of course, has had its effect on the volume of merchandise moved. The table below gives details of the receipts for the four weeks of 1946 and 1945, and also those for the comparable period of 1939.

FOUR WEEKS ENDED AUGUST 11, 1946

	1946 £000	1945 £000	+ or − £000	Per cent. + or −	1939 £000
Passengers	20,791	20,464	+327	+ 1·6	11,149
Merchandise	7,544	8,306	−762	−10·0	4,152
Coal and coke	3,405	3,227	+178	+ 5·2	2,276
Total	31,740	31,997	−257	− 0·7	17,577

AGGREGATE FOR THE THIRTY-TWO WEEKS OF THE YEAR

	1946 £000	1945 £000	+ or − £000	Per cent. + or −	1939 £000
Passengers	124,362	128,679	− 4,317	− 3·4	63,656
Merchandise	63,547	79,395	−15,848	−24·1	33,615
Coal and coke	29,609	29,426	+ 183	+ 0·6	21,031
Total	217,518	237,500	−19,982	− 8·7	118,302

For the 32 weeks of the year so far, the total receipts of £217,518,000 are lower by £19,982,000, or 8.7 per cent., than for the similar period of 1945.

* * * *

Overseas Railway Traffics

A decrease of ps. 3,000 in the week ended August 17 gave the Buenos Ayres & Pacific a net gain for the fortnight of ps. 14,000. The other three principal Argentine companies have improved upon last year's results in both weeks under review, the advances being ps. 483,000 on the Buenos Ayres Great Southern, ps. 239,000 on the Buenos Ayres Western, and ps. 81,920 on the Central Argentine. Entre Rios receipts lost ps. 70,900 in the week ending August 10, but a gain of ps. 72,700 in the next seven days gave a net increase on the fortnight of ps. 1,800. Aggregate traffics for the seven weeks, however, show a decrease of ps. 39,200. In the fortnight to August 3, Central Uruguay receipts decreased by £1,656, but the next fourteen days showed a gain of £7,000. Results are compared in the table below:—

	No. of week	Weekly traffics	Inc. or dec.	Aggregate traffics	Inc. or dec.
Buenos Ayres & Pacific* ...	7	2,050	− 3	14,988	+1,127
Buenos Ayres Great Southern*	7	3,040	+286	23,036	+1,959
Buenos Ayres Western* ...	7	1,201	+182	8,062	+ 535
Central Argentine*	7	3,011	+ 80	21,549	+ 653
		£	£	£	£
Canadian Pacific	32	1,450,250	−170,000	43,695,750	−5,400,250

* Traffic returns in thousands of pesos

Canadian Pacific traffics declined by £351,000 in the fortnight to August 14. In the corresponding weeks of 1945 a gain of £140,800 was shown on the previous year.

* * * *

Rhodesia Railways Limited

Gross revenue of Rhodesia Railways Limited for the year ended September 30, 1945, declined by £368,283 to £6,192,760, but working expenses, at £4,076,360, showed an increase of £47,407. After providing for all charges, including debenture stock service, the profit for the year was £141,298, compared with £498,025 in the previous year. The decrease in gross revenue was accompanied by a fall of 3.6 per cent. in the tonnage handled. Results are compared in the table below:—

	1943-44 £	1944-45 £
Passenger revenue	928,525	930,086
Goods revenue	5,203,558	4,823,348
Road motor services	100,722	99,547
Gross revenue	6,561,043	6,192,760
Working expenditure	4,028,953	4,076,360
Surplus on working	2,532,090	2,116,400

The operating ratio rose from 61.4 per cent. to 65.8 per cent. A statement by the Chairman, Mr. Arthur E. Hadley, which accompanies the report, says that difficulties were experienced during the year from shortage of staff and materials, and from strikes by African employees both in Southern and Northern Rhodesia. These have been settled by grants of increased pay and other concessions. Estimated gross revenue to May 31 this year is £78,596 higher, but working expenditure has risen by £328,337, largely because of increases in cost of living allowances and wages.

* * * *

The L.M.S.R. Royal Train

Elsewhere in this issue we describe and illustrate three vehicles constructed by the L.M.S.R. in 1941 for use by the King and Queen. These vehicles, which were extensively used during wartime, are now included in the permanent formation of the Royal train. The general arrangement of the two Royal saloons is similar, providing in each case a lounge, bedroom, and bathroom, together with quarters for personal attendants. The saloons are air conditioned; steam and electricity are used jointly as the heating medium, and wet ice for cooling purposes. A choice of six temperatures may be made in both the heating and cooling cycles. The extensive use of electricity for lighting, heating, ventilating, etc., combined with the exceptional conditions under which the Royal Train frequently operates, made a departure from standard railway practice desirable. In place of the customary axle-driven generators, the electricity supply is furnished by a power plant installed in a third coach, which consists of a convertible sleeper, brake, and power car, fitted up primarily as a service vehicle which can be marshalled either at the rear or front of the train. Spare parts for maintenance are carried in this compartment, which also houses a 25-line automatic telephone exchange, as well as the engine-room for the generator sets, and the brake compartment. The weight of each saloon is 57 tons and the power car weighs 52 tons.

* * * *

The International Union of Railways

After an interval of more than six years, the International Union of Railways has been able to resume the publication of its bulletin. The first number is dated April-May, 1946, and a copy of the English edition has just reached us. The Board of Management, convened for February 5 last, and the General Assembly, called together for February 7, held successful meetings in Paris. Despite travelling difficulties, a large majority of the Member-Administrations of the union took part in these meetings. Questions of considerable importance to the development of international traffic were entered on the agendas of the committees, which will meet from September

2 to 14. The first post-war number of the bulletin is devoted to an account of the meetings held in February last, and to a tribute to the memory of Gaston Leverve, who died on December 7, 1945, after having held the position of General Secretary since the formation of the union on December 1, 1922.

* * * *

L.P.T.B. "Closed Shop" Decision

The decision of the London Passenger Transport Board to insist on all trade union grades of employees becoming members of the Transport & General Workers Union, has given rise to a good deal of misgiving. It was recognised by many that steps of this kind might be taken in industry, as a result of the recent repeal of the Trades Disputes Act, but that does not make the recent decision any more palatable, nor is it the only one which appears likely. The Manchester Ship Canal Company is involved in a dispute between the National Union of Railwaymen and the Associated Society of Locomotive Engineers & Firemen as to whether certain of its employees should be members of the latter union. The movement, indeed, seems likely to spread. It is by no means clear, as yet, what part the Government has played behind the scenes in the London Passenger Transport Board decision, but it seems in the highest degree unlikely that the Minister of Labour and the Minister of Transport were unaware of the decision before it was taken. There is no doubt that when Parliament reassembles, an attempt will be made to extract from the Government its policy on this matter.

* * * *

The Potters Bar Triple Collision, L.N.E.R.

How a few circumstances can play a part in determining the seriousness of the results of an accident was well shown by the triple collision at Potters Bar, L.N.E.R., on February 10, 1946. This had all the makings of a heavy casualty list, yet only two fatalities occurred. The inquiry involved a good deal of conflicting evidence and much investigation before Sir Alan Mount was able to arrive at a conclusion on the main point at issue. His report is necessarily of considerable length. Our summary of its essentials appears at page 250. The driver of the local train is thought to have overrun the slow line inner home signal, through taking the adjacent main line arm as applying to him—no new phenomenon—probably after being misled by premature clearing of the outer home. An attempt to divert him from striking some buffers resulted in points being reversed under the first coach. The report recommends, among other things such as track locking alterations, the early rebuilding of the station, and, indeed, it is time, we think, that the Hadley Wood bottleneck was got rid of altogether.

* * * *

Conversion of Locomotives from Coal to Oil Burning

WE publish on page 253 of his issue a statement by Mr. Alfred Barnes, Minister of Transport, indicating that he has authorised the main-line railway companies to proceed as quickly as possible with the conversion of 1,217 engines from coal to oil burning in order to secure an estimated saving of 1,000,000 tons of coal per annum. The work involves not only the alteration of the engines, but the supply and erection of storage tanks for oil at some 58 places, and the construction of some hundreds of rail tanks for conveying oil from the ports to the storage depots.

If the Government's intention is that extensive conversion will assist the coal situation during the critical winter months, it is evident that the work will have to be carried out very quickly. We imagine, however, that the supply of the material required will be the limiting factor. As a number of different types of engines are involved, complete standardisation of some of the parts required will be impossible, but it is clear from the Minister's statement that the research work already carried out by the G.W.R. will be of the utmost value in facilitating this wholesale conversion and in problems connected with operation, re-fuelling, and storage.

Further, until the storage installations are complete, the companies will lose the use of a number of heavy passenger and freight engines, which will necessarily retard desirable improvements in train services, and in some areas might even involve a temporary reduction in existing services. In addition, the transfer of men from engine repairs and/or construction to the conversion work, will adversely affect the engine repair position, which is already far from satisfactory, and this, in turn, may also react on the maintenance of existing train services generally.

Apart from the capital costs of conversion which will, presumably, be borne by the Ministry of Transport, the use of oil will necessarily involve a substantial increase in the cost of operating the engines, seeing that the price of oil is about 2½ times that of coal. This factor, presumably, will not matter so long as the additional cost involved can be debited to the railway control account, but it will be an additional factor to be borne in mind when the Railway Charges Consultative Committee shortly commences its review of railway charges.

* * * *

G.W.R. Housing Difficulties

IT seems clear from recent press statements that local authorities do not fully appreciate the special conditions which attach to railway employment, and which justify railwaymen being accorded special treatment in the matter of housing accommodation.

To enable the public to continue to secure the benefit of the facilities normally provided by railway transport, it is necessary from time to time to transfer railway employees from places where they have hitherto lived with their families to other places on the railway system, to meet the exigencies of traffic. This is particularly the case where all-line promotion arrangements exist, as in the case of the G.W.R. The impossibility of obtaining housing accommodation in other localities is apt to deter railwaymen from accepting promotion to more responsible posts, for which they would be most suitable, because it would at once involve them in housing difficulties.

Failing an improvement in the housing position, railway operation may be handicapped. To assist in mitigating these difficulties, the G.W.R. directors authorised the extension of the company's existing housing estates and the formation by G.W.R. employees of new housing associations. Responsibility for housing the community generally obviously rests with the local authorities, but the activities of railway housing societies could, and should, prove as useful a supplement to the work of those authorities as they have done in the past.

* * * *

Railway Charges Inquiry

THE Charges Consultative Committee has now reported to the Minister of Transport on the suggested adjustment of L.P.T.B. charges to enable it to yield as nearly as practicable during 1947 a net revenue of £4,835,705, which is the fixed annual sum payable to the Board under the Railway Control Agreement. The recommendations of the Committee, however, have not yet been published.

On September 16 the Committee will proceed with the second stage of its task, which is to advise the Minister of Transport what adjustments in railway charges are necessary so as to secure that the net revenue earned by the controlled railway undertakings during 1947 will approximate the fixed annual sum of £38,633,000 payable to them under the control agreement.

In considering this question the Committee has been directed to take into account all relevant considerations, and, while aiming at an equitable distribution of charges between the various classes or groups of classes of traffic, to have regard to the Government's policy of full employment and to the importance of maintaining adequate coastwise shipping services.

It is understood that Mr. C. R. Dashwood, Chief Accountant of the Great Western Railway, will give evidence on financial matters, and Mr. F. A. Pope, Chief Commercial Manager of the London Midland & Scottish Railway, evidence on commercial matters. We gather, however, that these witnesses are appearing as the result of a request from the

Minister of Transport to the Railway Executive Committee that they would arrange for the railway companies concerned to give the Charges Consultative Committee any assistance it might require. They are, therefore, quite impartial witnesses, as the railway companies are entitled under the Control Agreement to a fixed annual payment and will not be advantaged or prejudiced if the level of charges which may be fixed by the Minister after receiving the recommendation of the Committee yields a net revenue in 1947 greater or lesser than the sum to which they are entitled.

The inquiry appears likely to last appreciably longer than that into the L.P.T.B. fares, which occupied seven days, as more than forty bodies have given notice that they wish to be heard at the inquiry, including the National Coal Board, the Mining Association of Great Britain, and a number of local authorities.

* * * *

Sir Alan Mount's Annual Report

ALTHOUGH "the cessation of hostilities brought a certain measure of relief to the railways," says Sir Alan Mount, Chief Inspecting Officer of Railways, in his annual report for 1945, recently issued, "many operating difficulties remained, the most serious being shortage of experienced staff. The return of men on demobilisation had made little headway by the winter, and there was abnormal sickness and some absenteeism, due largely to the strain of working long hours during the war. Shortage of skilled staff and materials also prevented the overtaking of arrears of maintenance of rolling stock, permanent way and signalling, thus increasing failures in traffic, accentuating congestion and delay, and in some cases causing accidents." Nevertheless, he is able to record as noteworthy that the total fatalities in all movement on rail during the year were the minimum for the six eventful years 1940-1945 and 19 per cent. less than the peak in 1941.

They were, it is true, considerably higher than in the inter-war period, but "it is surprising," says the report, "that the number was not greater, having regard to the traffics handled, coupled with the strain of wartime conditions and difficulties," whilst the fatalities in train accidents, strictly so-called, when analysed "afford no justification for thinking that the high standard of safety has been impaired," although the figure compares unfavourably with the averages for 1940-1945 and 1935-1939. Referring to the unfortunate run of exceptional accidents early in the present year, there is no indication, Sir Alan considers, "of some general and remediable cause."

The report is based on the system of reporting accidents introduced under a Statutory Order issued at the beginning of the war, and again appears in the abbreviated form brought into use in 1940. The Order in question was revoked at the end of 1945 and a new one substituted, which re-introduced the reporting of accidents on the usual peacetime basis, and the averages quoted for the period 1940-1945 cover the time when modified reporting was in force.

The useful table, reproduced on page 233, which first appeared in the report for 1941 and which analyses the various causes of train accident, shows that there were 363 such accidents, compared with 402 in 1944, resulting in fatalities to 45 passengers, 17 servants, and 13 other persons, compared with 12, 8, and 14 in the previous year. Failure of the human element caused 155 of the accidents (involving more than 3 hours' delay) compared with 188 in 1944 and an annual average of 182 for the period 1940-1945. Failure of train crews accounted for 34 collisions and 53 derailments, compared with 58 and 63 respectively in 1944, and accidents due to mechanical failures of rolling stock and engines totalled 95, against 99. Those attributable to defective track and/or signalling apparatus amounted to 38, an increase of 17.

Thirteen Formal Inquiries

Thirteen train accidents were made the subject of formal inquiries—others were dealt with by correspondence and consultation—and have been referred to already in our columns, frequently at some length. At Esher, on January 28, 1945, an electric train was irregularly admitted to an occupied section as a consequence of a signalman's mistake in operating the lock-and-block system, and collided with a steam train just starting away from a home signal. One passenger was killed. The report on the case made reference to the advantages of track circuiting and colour-light signalling, and recommended the strengthening of certain portions of the carriage underframes, leading to the adoption of an improved design. An unusual accident took place at Kings Cross, London, on February 4, 1945, resulting in two fatalities, when a locomotive hauling a heavy passenger train, still slipping in forward gear on a 1 in 105 gradient, was overpowered by the weight of the train, and ran backwards in a tunnel for some 200 yd. without the trainmen realising it. Some power points were reversed in an endeavour to divert the train, but too late; they moved over between the bogies of the last—then the leading—coach, which was derailed and overturned. A combination of circumstances and mishandling of the engine caused the failure to negotiate the gradient, and recommendations were made and accepted covering the installation of guiding lights in the tunnel. Such lights are also being provided elsewhere on the railway.

At Bootle, in Cumberland, on March 22, 1945, a wagon in a group of seven loaded with depth charges was found to be on fire, and an attempt was made by uncoupling and drawing forward, to isolate the burning vehicle, which later exploded. The driver, who for a reason not certainly known was going back towards it, was killed. "The stringent safety regulations governing the carriage of explosives by rail," says the report, "were necessarily relaxed during the war, including the rule that loads of explosives must be marshalled in the middle of the train.

"Following this accident, however, and a somewhat similar case at Gascoigne Wood on April 18, the rule was reinstated for partial train loads of explosives, and as a better guide to the staff in marshalling a return was made to the more distinctive peacetime 'Explosives' label. Provision was also made in the rules that guards should inform enginemen when explosives are being conveyed. . . ." It is noteworthy that these two accidents, and the one at Soham on June 2, 1944, were the "only cases of fires leading to serious explosions in running trains during the whole of the war, despite the countless train loads of ammunition which were carried by the railways."

At Dale Lane, Kirkby, on April 19, 1945, traffic had been held up at connections to a war factory, as a signalman had overslept, and a young signalman, going to another location, offered to open the signal box to remedy the difficulty. The weather was foggy. His lack of experience, combined with a misunderstanding between himself and a guard—who ought to have made the position quite clear to him—led to an engine and van being overlooked on the main line, and an express being allowed to run into them, causing 5 fatalities.

A peculiar case of overrunning a signal occurred at Caterham on June 26, 1945, when, in daylight and clear weather, the motorman of an electric train started on the guard's signal, although the starting signal was at danger, and, being directed towards the down line at a scissors crossing, proceeded along it and collided head-on with a train from London. Both motormen were killed. On July 21, 1945, another case of overrunning occurred at Ecclefechan, when an express ignored distant, outer home, and inner home signals and collided with a goods train being shunted for the express to pass. The enginemen of the express were killed, and the failure of the driver, a capable man, remained unexplained. It was recommended that a review of the question of applying intermittent warning automatic train control should now be undertaken, at any rate for the high-speed routes. This matter was brought again into prominence by the very serious accident at Bourne End on September 30, 1945, when another express, also in charge of an experienced man, failed to slow down on a double-yellow warning, took a crossover junction at speed and left the rails. Unfortunately, the engine overturned into a field below the level of the line, and the wreckage of the train was unusually bad, resulting in 43 fatalities. Here, again, the driver's failure could not be accounted for, but the companies were recommended to consider the use and uniformity of the double yellow indication in relation to both semaphore and multiple-aspect signalling, the retarding of the clearance of stop signals in all cases of slow speed diversion from a high-speed route, more precise definition of certain guards' duties, and the initiation of warning automatic train control on main lines, properly adapted for use, when necessary, with multiple-aspects.

Two other accidents presented unusual features. The one

Causes	Type of accident					Totals
	Collisions	Derailments	Running into obstructions	Fires in trains	Miscellaneous	
1. Failure of train crew (including guard) :—						
(*a*) Passing signals at danger	16 (42)*	10 (9)	1 (1)	— (—)	— (—)	27 (52)
(*b*) Other irregularities or want of care	18 (16)	43 (54)	— (—)	— (—)	— (—)	61 (70)
2. Failure of signalman :—						
(*a*) Irregular block working	5 (6)	2 (—)	— (—)	— (—)	— (—)	7 (6)
(*b*) Other irregularities or want of care	17 (12)	18 (12)	— (—)	— (—)	— (—)	35 (24)
3. Failure of train crew and/or signalman and/or other staff	12 (15)	5 (12)	— (—)	— (—)	— (—)	17 (27)
4. Failure of other staff in operating departments (excluding faulty loading : see 10 below)	1 (2)	5 (7)	1 (—)	1 (—)	— (—)	8 (9)
5. Accidental	— (—)	4 (3)	— (—)	3 (—)	— (—)	7 (3)
6. Defective drawgear	1 (16)	38 (33)	— (—)	— (—)	— (—)	39 (49)
7. Defective stock, other than drawgear	1 (—)	44 (38)	— (—)	— (—)	— (—)	45 (38)
8. Defective engines	— (1)	11 (11)	— (—)	— (—)	— (—)	11 (12)
9. Defective track and/or signalling apparatus	1 (—)	37 (21)	— (—)	— (—)	— (—)	38 (21)
10. Faulty loading	— (—)	15 (25)	— (—)	1 (—)	— (2)	16 (27)
11. Due to snow, landslides, flooding, etc.	— (—)	5 (2)	14 (7)	— (—)	— (—)	19 (9)
12. Miscellaneous	3 (4)	19 (38)	8 (6)	2 (6)	1 (1)	33 (55)
Total	75 (114)	256 (265)	24 (14)	7 (6)	1 (3)	363 (402)

* Information in brackets relates to 1944

at Llangollen on September 7, 1945, arose from the bursting of a canal bank. Part of a line was washed away, although the block wires unfortunately remained intact, and a train ran into the gap in the permanent way and was completely wrecked. The driver was killed. The canal, 150 years old, serves now only as a feeder to others and for industrial water supplies. Maintenance of the length concerned has always been troublesome, and a slip at the site had occurred in 1938, when a counterfort wall was built. The failure was thought to be due to the cumulative effect of erosion created by natural water channels in the boulder clay formation, combined with a very heavy rainfall and road traffic vibration. The canal bank has been thoroughly strengthened, but as some risk may remain, protective measures are under consideration.

At Haywards Heath, on September 2, 1945, an empty carriage train was diverted into a siding, with the intention of reversing it in connection with single-line working, but it failed to stop, and dashed at speed into buffer stops. The enginemen were killed. The siding inlet subsidiary signal, of the type common on the route, was green, and all running signals red. The driver had not taken, however, a copy of the single-line working notice, nor had the guard examined the one available for his inspection, and it was recommended that additional steps be taken to ensure notices being brought to trainmen's attention. Misreading of signals also contributed to the accident at Woking on November 10, 1945, when a steam train collided with another just starting from a home signal. An oil lamp in a signal had become so badly sooted as to be practically invisible, and this created a confusion between fast and slow line indications. This was considered to be due to the inferior quality oil which had to be accepted in wartime. Fortunately the Petroleum Board has now been able to arrange for the railways again to have the superior quality long-burning oil essential to the efficiency of signal lights.

At Northwood on December 31, 1945, in foggy weather, a locomotive-drawn electric train proceeded against an automatic signal at danger and collided with one ahead, stopped at a controlled signal. Fire broke out and three passengers were suffocated. The train carried no short circuiting bar, and 13 minutes elapsed before the current was cut off, before which it was thought risky to use fire hoses. Soda-acid hand extinguishers carried on the trains were used, but a considerable proportion failed to work. The motorman had failed to regulate his speed to suit the prevailing visibility, while the standing train should have been protected by a detonator 100 yd. in rear. No fog-signalman was at his post, however, owing to a series of misunderstandings. There was no telephone at the signal, and the "stop and proceed" rule was in force for ordinary working and not for emergencies only. Its abolition for regular movements had been under consideration before the war, and main-line practice is now to be adopted on this route; a more comprehensive procedure has been introduced for inspection and testing of fire extinguishers, the failures of which were very thoroughly investigated. It was recommended that the carrying of short-circuiting bars on trains other than tube trains, which already have them, should be reconsidered.

Turning to level crossing accidents, we find that an inquiry had to be held into one which took place at Grays on June 14, 1945, when a passenger train struck a lorry, killing two of its occupants. There were no signals there, and the gates opened away from the line. The gateman had disobeyed instructions and opened the gates after receiving the approach warning. Traffic, once negligible, had become considerable, and the line is a busy one. The installation of interlocked gates and signals was recommended, unless construction of a bridge could be resumed early. There were 74 serious casualties at crossings in 54 accidents, compared with 64 and 58 in 1944, 51, compared with 47 in 1944, being pedestrians. Nine service personnel were killed or seriously injured in 6 accidents, while traversing level crossings, compared with 10 the previous year. The figures for the number of public road and occupation crossings remains unchanged.

Other than Train Accidents

During 1945, 305 inquiries were held into accidents, other than train accidents, involving fatal or serious injuries to 325 persons, nearly all railway servants; the remainder were principally contractors' servants and persons at work or transacting business on companies' premises. As a result, 76 recommendations were embodied in the reports, of which 59 were adopted, 3 not adopted, and 14 are still under consideration; in addition a considerable number of verbal suggestions were made and accepted.

Movement accidents to passengers were mainly due to misadventure, or else want of caution or misconduct, and there is practically nothing the railways can do to affect the situation for the better. But serious interest must continue to attach to the accidents befalling men working on the track, in which all cases of injury may be assumed to have been reported, as such accidents are invariably of a serious nature. Casualties were 71, against 69 in 1944, and were one less than the 1940-1945 average, but fatalities were one above the average for that period, which was 52. "Want of personal care," says Sir Alan, "was again the cause of the majority of the accidents," and the report dwells once more on the paramount necessity of carrying out strictly the important rule No. 234(*a*), observing that "it is regrettable that it does not receive more attention from those for whose protection it is intended.

Of the 23 casualties due to non-observance of the rule, 11 concerned gangers and senior men; each represented an unfortunate example to be avoided by others holding similar positions of responsibility." It is emphasised that when a look-out is present, he is intended for the protection of persons at work, and once his warning is heard it becomes the duty of each of them to choose a position of safety and keep watch for himself. The look-out may have a large number to protect, and be compelled to stand at some distance from them, making it unwise—even dangerous—for him to have to assume responsibility for the positions so taken up. The recommendation made in the 1944 report regarding the dissemination of information concerning the circumstances of accidents is repeated, whilst special attention is directed to the casualties

Annual average, 1915-19	Annual average, 1920-24	Annual average, 1925-29	Annual average, 1930-34	Annual average, 1935-39	Annual average, 1940-45	Particulars	Year 1944	Year 1945
898 in 1919	1,009	941	796	746	388 serious damage only	Accidents to trains	402 serious damage only	363 serious damage only
11,452 in 1919	11,153	9,141	5,772	4,129	160 serious damage only	Accidents to, or failure of, rolling stock or permanent way	149 serious damage only	161 serious damage only
K. 174 341 101	K. 92 248 67 / I. 1,731 3,600 175	K. 91 210 67 / I. 3,733 3,267 158	K. 74 183 51 / I. 4,394 2,592 146	K. 86 198 54 / I. 5,342 2,576 120	K. 141 254 82 / I. 256 455 34	Casualties : Passengers ... ... Servants ... ... Other persons	K. 131 263 95 / I. 248 510 25	K. 134 238 64 / I. 215 415 35
616 5,506	407 6,231	368 7,158	308 7,132	338 8,038	477 745	Totals	489 783	436 665
2,065 in 1919	1,848	1,661	1,612	1,740 (1935-1938)	1,210 450·7	Passenger journeys originating, including season ticket holders (millions) Railway companies ... ... L.P.T.B.	1,345·3 508·4	1,371·8 561·5
not available " "	322 17,457	320 17,562	288 16,060	299 17,230 (1935-1948)	289 23,844	Freight tonnage (millions) ; excludes free hauled from 1940 ... ... Ton miles (millions) (estimated from 1942, main-line companies only)	293 24,444	266 22,023
590,702 in 1913	698,756 (1921-1924)	678,738	602,288	592,365	603,803	Servants employed (March)	616,756	622,369
334·2 in 1919	368·7	401·3	416·2	411·8 31·9	356·3 25·6	Passenger and freight train mileage (millions) : Railway companies ... ... L.P.T.B.	357·1 25·2	358·3 25·3
123·5 in 1919	121·5	122·7	112·8	115·0	122·8	Shunting mileage (millions)	127·1	119·5
not available	28·3	28·9	26·8	29·4	36·8	Light engine mileage (millions)	39·4	37·4
1·8 16·5	1·1 17	0·9 18	0·7 17	0·8 18	1·2 1·9 (seriously only)	All casualties per million train miles : — Killed ... ... Injured	1·3 2·0 (seriously only)	1·1 1·7 (seriously only)

suffered by staff walking or standing on the line on duty, or when proceeding to or from work. These totalled 164, comparing badly with 124 in 1944; fatalities increased from 86 to 107.

These accidents, arising for the most part from want of care, may be classed under two heads, those at stations, mainly due to crossing the line itself instead of using a subway or footbridge, and those elsewhere, when staff were proceeding along tracks. "It is difficult to account," we read, "for the regrettable increase; it may be due to the cumulative effect of the war period combined with a tendency to relax when hostilities ceased. Many of the accidents resemble those which occur to men working on the permanent way, through moving aside on the approach of a train and stepping or standing in the path of another." A case is cited where men were walking facing the direction of traffic when they saw a train approaching. It was on the inner track of a curve and prevented them from seeing that they were "in no danger from another train approaching them unobserved," to quote Rule 234 (*a*). Instead of keeping clear of all tracks they continued to walk on the other line, were overtaken, and killed. Sir Alan regards it as unfortunate that the rule should be addressed solely to persons actually at work on the line, and having regard to its value to all who have to work, walk, or stand on tracks, repeats a recommendation made previously that its inclusion in the Rule Book in an earlier section, where the safety of all grades is dealt with, be considered at the next revision.

Fewer Shunting Accidents

Shunting accidents resulted in 23 fatalities, a decided improvement over the 1944 figure of 47, and average, 50, for 1940-1945, partly due, perhaps, to improved lighting, for the blackout affected shunting more than any other class of railway work. Fatalities, three in all, again appeared, after a clear year in 1944, in connection with braking and spragging operations. Three women employees were killed in movement accidents and 13 seriously injured, against 8 and 11 in 1944.

Trespassers and suicides need not concern us here, but 51 other persons, not passengers or servants, were killed in movement accidents, compared with 81 in 1944, of which 41 were pedestrians struck by trains at crossings, 14 of them at public road crossings after using wickets. Eight occupants of road vehicles were killed in 7 accidents, 5 of which caused less than 3 hours' delay to rail traffic, so that they were not looked on as train accidents under the modified system of reporting.

The customary table recording all movement on rail is reproduced in our usual form. Liability to casualty to passengers in train accidents was one killed in 43 millions carried, while as regards casualties to servants, passenger and freight train mileage was about 23 millions per fatality and 43 millions per serious injury. The rise and fall in the annual averages of deaths in train accidents since the 1914-1918 war are given by the following figures:—

1920–1924	25	Annual averages	1940	50	
1925–1929	38		1941	76	
1930–1934	25		1942	37	
1935–1939	39		1943	14	
1940–1945	48		1944	34	
			1945	75	

"Passenger travel," observes Sir Alan, "as represented by journeys, was 4·3 per cent. greater than in 1944 and 11·8 per cent. greater than in 1938. There was much overcrowding on main-line and suburban trains, and a considerable increase occurred in the average length of passenger journeys. While the higher volume was conveyed by about 24 per cent. fewer loaded passenger train-miles than in 1938, it is estimated that passenger miles increased by no less than 79 per cent. as compared with the twelve months ended August, 1939. In addition, freight train-mileage continued much above pre-war level . . . net ton-miles were 35 per cent. more than in 1938, or, on the average, nearly 16 millions more per day. . . . The strain of the war and its aftermath are still affecting operation, and it will be some years before the heavy accumulation of renewals of track and rolling stock can be overtaken, particularly if the present shortages of materials persist. But I feel little doubt that the high standards of efficiency and safety at which the railways entered the war, and which were so well maintained throughout the six years, will be still further improved as conditions become more settled."

LETTERS TO THE EDITOR

(*The Editor is not responsible for the opinions of correspondents*)

Gauge Standardisation

The Deanery, Stanley,
Falkland Islands. June 12

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—It would seem to be the intention to spend large sums on railway development throughout the world. Is it not time that some effort were made to bring about uniformity of gauge? Australia would appear to be taking this matter in hand seriously; but what about Europe, Asia, and South America?

If a start could be made by the conversion of all railways with a gauge of more than 4 ft. 8½ in. to standard, then a commission could decide which narrow-gauge lines should be widened to complete the links.

Russia, Spain, Portugal, and India in particular would appear to have much to gain and little to lose, and in the case of South America a co-ordinated system might one day be linked to North America.

To avoid certain countries bearing the whole expense, some kind of international financial aid could be arranged.

The campaigns conducted in Russia during the recent war would appear to nullify any argument against standardisation on military grounds.

Yours faithfully,
R. G. R. CALVERT

Naming Locomotives after the C.M.E.

21, Briarfield Road, Tyseley,
Warwickshire. August 9

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—In reply to your correspondents with regard to honouring the names of past and present locomotive engineers by bestowing their names on present-day locomotives, the only G.W.R. engine *at present* to bear the name of a G.W.R. C.M.E. is the "Castle" class engine *Sir Daniel Gooch* (the father of Swindon), although of course the names *Armstrong, Gooch, Brunel,* and *William Dean* have been borne by earlier G.W.R. locomotives, now all withdrawn from service. I believe William Dean's engine No. 7, *Armstrong,* was the first coupled bogie (4-4-0 type) to be put into service on the G.W.R., being built in 1894.

I entirely agree with Mr. Podmore when he suggests that the names of football clubs, counties, and so on, do not give character or individuality to a locomotive, but I rather think that the G.W.R. "Castle" names are very appropriate. The stately "Castles" are, perhaps, the most elegant, the most handsome, and, indeed, the most successful of the British 4-cylinder 4-6-0 type, and their names seem to recall the once stately and majestic homes of England.

However, I think many will agree that the names of both past and present chief mechanical engineers are, perhaps, among the *very finest* names that could ever be bestowed upon a locomotive, for it is their endeavour, skill, enterprise, and hard work that has brought the British steam locomotive to the high standard of perfection we know today; and surely their names must rank among the noblest, and most distinguished in British history, whether they be inventors, scientists, statesmen, or military heroes.

Yours faithfully,
A. RICHARDS

Named Railway Trains

60a, Green Lane, Northwood,
Middlesex. August 19

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—The interesting article in *The Railway Gazette* of August 16 on named trains in this country and in the U.S.A., suggests to me the possibility of obtaining some information on the origin of the name of a train running on the New South Wales Railways system. Early in this year a correspondent in New South Wales wrote to know if I could help him to discover the origin of the name of one of their most famous trains, "The Fish." He wrote as follows: "This train first commenced running in the early days of the N.S.W. Railways.

"It now runs from Mount Victoria, on the Blue Mountains, to Sydney in the mornings, and returns in the evenings. It has always been a fast passenger train and noted for its punctuality. Since the 1870s, or very early 1880s, the train has been known universally as 'The Fish,' although it has not at any time in its history carried fish as part of its freight in the luggage van. In 1932 the New South Wales Railway Department officially recognised the name, which is now painted on the set of carriages forming the train."

My correspondent states that local investigation has traced the origin of the name of the train to John Heron, who was the driver from about 1870 to 1888. Heron himself had come in 1861 from the Glasgow & South Western Railway, and because of his experience in Scotland, he was appointed as an engine driver in New South Wales. He frequently spoke of a well-known early morning train in Scotland which ran for the sole or principal purpose of carrying fish, and which had to be run strictly to time. Since punctuality was a feature of his in New South Wales, he nicknamed it "The Fish"—a name now officially recognised.

They want to know in New South Wales if there was a well-known fish train, smartly timed, in Scotland prior to 1861, when John Heron left the Glasgow & South Western, and any details about the train. I have no information. Heron is, of course, dead.

Yours faithfully,
REGINALD B. FELLOWS

9, Keble House, Manor Fields,
Putney, S.W.15. August 18

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—The writer of a letter in your issue of August 16 expressed non-comprehension concerning the title of "The Purple Emperor" applied to an American freight train.

Please refer him to Kipling's "0.007" in "The Day's Work" of which the following are extracts:—

"Now I'll show you something worth," said Poney; "when the Purple Emperor ain't on time, it's about time to amend the Constitution."

". . . . but 0.007 had caught one glimpse of the superb six-wheel coupled racing locomotive who hauled the pride and glory of the road, the gilt-edged Purple Emperor . . ."

The whole story, as you know, centres on imaginary conversations between personified American locomotives of different types, culminating in a triumph for the much despised "0.007," when she goes out with a breakdown train to the scene of a "ditched" freight-train.

It is true that the Purple Emperor of fiction was a luxury passenger train ("the millionaires' special"), but there is a precedent for naming a "freight" after an illustrious train belonging to the higher category. Before the war the 9.32 p.m. Old Oak Common to Penzance "fitted freight" on the G.W.R. was known as "The Cornishman," although I admit that the men who worked it gave it a more pungent soubriquet!

Yours faithfully,
J. E. L. SKELTON

L.M.S.R. Locomotive No. 20002

The Gables, Attenborough,
Notts. August 12

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—In the issue of *The Railway Gazette* dated August 2, I read a letter from Mr. W. O. Skeat with interest, regarding the L.M.S.R. locomotive No. 20002. I agreed certainly with his remarks that this locomotive should be preserved, but I am astonished to know of the railway decision not to preserve it, in spite of a number of requests. This recalls to me that some years ago I had personal correspondence with Mr. Rankin, then of the Chief Mechanical Engineer's Department, Derby, regarding the question of 20002's future. I believe he was very interested over this, and would have liked to see this engine preserved, because at first the railway company had saved No. 1 for a number of years before deciding to break it up owing to shortage of scrap during the war. Unfortunately, our efforts met with no success, and I am sure every railway lover will feel sorry when 20002 is doomed.

In Mr. Skeat's letter, he said he had heard a report that this locomotive was now in Derby shops and under consideration for scrapping, which made me feel very sad as I had not seen it for a number of weeks. This locomotive had been working regularly in the Nottingham district. However, only this morning, when I was travelling from Attenborough to Nottingham, I was greatly relieved to see it in service once more, running as a light engine coming out of Nottingham. It looked so clean that I believed it had returned from Derby where it had received a new coat of paint, so we all now hope to see it live on many more months. Perhaps Mr. Skeat will be delighted to hear the latest news of the famous 20002.

With best wishes for your paper,

Yours faithfully,
J. H. GIBBONS

XUM

The Scrap Heap

NEXT WEEK'S RAILWAY CENTENARY

Syston to Melton Mowbray (10¼ miles), Midland Railway, opened September 2, 1846.

* * *

WARDROBE ON WHEELS

Fitted out as a travelling wardrobe to hold 500 ladies' coats and costumes for export, a G.W.R. container is being used on a shuttle service between a factory at Treforest, South Wales, and a London warehouse. The fitments allow groups of garments on the coat hangers to be lifted out on arrival and carried direct to the racks in the warehouse. On the return journey, the container carries bales of cloth, canvas, and tailoring materials, with the fitments and coat hangers for the next journey.

* * *

BRUNEL ON ENGINE DRIVERS

I do not believe the men obtain the slightest knowledge of their instructions by reading. They may read them through and get up with the printed letters before their eyes, but, as to obtaining information, they do not . . . I am not one to sneer at education, but I would not give sixpence in hiring an engine-man because of his knowing how to read or write. I believe that, of the two, the non-reading man is the best (*sic*) and for this reason: I defy Sir Frederick Smith, or any other person who has general information and is in the habit of reading, to drive an engine. If you are going five or six miles without anything to attract your attention, depend upon it, you will begin thinking of something else. It is impossible that a man that indulges in reading should make a good engine-driver; it requires a species of machine, an intelligent man, an honest man, a sober man, a steady man, but I would much rather not have a thinking man.—*Extract from Mr. Brunel's evidence before the Select Committee on Railway Communications in* 1839.

* * *

A MAIL COACH HALFPENNY

The services to trade and public welfare rendered through the establishment of mail coaches by one John Palmer in 1782, were commemorated by the striking of the coin illustrated herewith, which has been sent to us by Mr. F. Plant. It is described as a "mail coach halfpenny," and is inscribed on one side, below the engraving of a coach and horses: "To Trade Expedition & To Property Protection. Payable in London." The inscription on the reverse, over initials which appear to be "J.F.," reads as follows: "To J. PALMER, ESQ. This is inscribed as a token of GRATITUDE for benefit received from the establishment of MAIL COACHES."

INSPECTOR OF THE "GROVE SPECIAL"

Mr. Edwin Shaw, of the Southern Railway, who retired at the end of August, had for 19 years been Inspector of Royal Trains. He made 30 trips during the war with the "Grove Special" conveying "Mr. Grove," in other words the King. Mr. Shaw recalls eight occasions when the "Grove Special" was under direct threat from air raids, the worst being on June 15, 1944, the first night of the flying bombs. The train, *en route* from Waterloo to Portsmouth, was stopped for the night at Horsley; two of the bombs passed low overhead, and many others came close. On another night earlier in the war, the train was delayed 40 min. between Victoria and Surbiton while bombs fell all around.

* * *

SOUTHERN RAILWAY MATERIAL IN NEW FILM

Among the sets now being erected at the Welwyn Studios for the Associated British picture "Temptation Harbour," starring Robert Newton and Simone Simon, is an exterior of a signalbox being built outside the studio lot. The interior of the box, which is to be erected inside the studios, is fitted out with the authentic material lent by the Southern Railway.

* * *

100 YEARS AGO

From THE RAILWAY TIMES, *August* 29, 1846

CORNWALL RAILWAY.—NOTICE IS HEREBY GIVEN, that the Act authorising the construction of this Railway having received the Royal Assent, all persons holding Scrip Certificates for Shares in this Company are requested to transmit the same for registration either to the Secretary, at his Office, Truro, or to William Wood, Esq. 449, West Strand, London, on or before Saturday, the 19th of September next, with their names, professions, and residences, distinctly written, in order that the same may be correctly entered in the Register of the Company. An official receipt will be given for the Scrip, which receipt will be afterwards exchanged for the Sealed Certificates with as little delay as the preparation of the same may require. Due notice will be given when the Sealed Certificates will be ready for delivery.

Shares, in respect of which no application for registry shall be made on or before the above date, will be registered in the name of the original Subscriber, after which no share can be passed otherwise than by a formal transfer under the provisions of the Act.

Forms of Letters claiming to be registered may be had at the Secretary's Office, Truro, or at 449, West Strand, London.

And Notice is hereby further given, that Interest after the rate of 4*l*. per cent. per annum, will be allowed on the Deposits paid upon all registered shares from the following times, viz., from the 1st of December, 1844, on the Deposit of 3*l*. per share on 50*l*. shares, and from the 1st of November, 1845, on the deposits of 2*l*. per share on 50*l*. shares, and of 2*l*. 10*s*. on 25*l*. shares. The Interest will be made up to the 29th of September next, and the Interest Warrants will be issued soon after the completion of the Registration.

By order of the Board,
P. P. SMITH, Secretary pro. tem.

Truro, August 18th, 1846.

Face-Saving saves Friends

When a customer is mistaken, never contradict him, or make him feel foolish. Agree that his idea may have been the practice formerly, or on some other railroad . . . but that the present method is so-and-so. This lets him feel his error is quite natural. In other words, give the customer every opportunity to "save face." Face-saving saves friends.

[From "Company Manners" issued by the New York Central System

THE FUTURE

Whilst the L.M.S.R. is taking every possible step to alleviate day-to-day difficulties as they arise, it has not lost sight of the fact that to overtake the arrears of maintenance and the lack of new building during the war years, and to provide a modern service which will meet the needs of the country, will involve an intensive campaign and the spending of large sums of money.

Schemes in process of being worked out for introduction as soon as conditions permit provide for a total expenditure of £140,000,000. The main effort during 1946 is to produce as much well-tried equipment as possible, which will have the effect of going some way towards restoring peacetime services. One of the schemes is the complete re-organisation and re-equipment of the operating control network. The effects of this £1,000,000 plan will not be apparent immediately, but ultimately it will result in improved efficiency all round in all matters pertaining to the running of trains.—*From "The L.M.S. Answers Your Questions."*

* * *

NAMED TRAINS IN THE U.S.A.—3

Passenger

Name	Railway	Scheduled run
Hub ...	... N.Y., N.H. & H.	New York—Boston
Hummer...	... Alton ...	... Chicago—Kansas City
Hustler ...	... Southern Pacific	Houston—Dallas
Iron & Copper County Express	Chicago & North Western	Chicago—Ishpeming
Iroquois ...	... New York Central	New York—Chicago
Jeffersonian	... Pennsylvania	... New York—St. Louis
Joe Wheeler	... Southern	... Chattanooga—Tuscumbia
Judiciary	... Pennsylvania	... New York—Washington
Kennebec	... Boston & Maine : Maine Central	Boston—Portland
Knickerbocker ...	New York Central	New York—Boston —St. Louis
Lake Shore Limited	New York Central	New York—Chicago
Lark ...	... Southern Pacific	Los Angeles—San Francisco

Goods

Flash ...	... Chicago & North Western	New Ulm—Winona
Flying Cloud	... Pennsylvania	... Buffalo—Scully
Fox ...	... Chicago & North Western	Eagle Grove—Belle Plaine
Gas Wagon	... Pennsylvania	... Detroit—Enola
Grab ...	... Reading	... Philadelphia—Bethlehem
Greyhound	... Illinois Central	... Memphis—Indianapolis

* * *

A HOUSE FLAG FOR THE NETHERLANDS RAILWAYS

In the description of this flag which appeared on page 208 of the August 23 issue, it was stated incorrectly that the design was the work of Mr. H. G. Tulp, Way & Works Department, Netherlands Railways. Though proposed by Mr. Tulp, the flag was designed by Mr. F. Weidema, an artist who has produced several of the latest advertisements and posters for the railways. In our reproduction, the winged wheel symbol should have been hatched vertically, to denote red.

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

SOUTH AFRICA

Wagon Building

South African Railways workshops built 102 goods wagons in April. New wagons placed in service totalled 174, of which 61 were built by South African firms and 11 were imported.

Proposed New Lines in Natal

The members of the Railway Board, and the General Manager of Railways, made a tour of Natal in July to study the possibilities of railway development and to discuss transport conditions with local public bodies in Natal. The Board studied suggestions for new railway lines linking Piet Retief with the North Coast line, Underberg with East Griqualand, and Mount Alida with Mooi River. It also investigated the possibilities of extending the South Coast line to Port Edward. At Kokstad a meeting was held with public bodies to consider a railway link with the Cape Eastern and Natal Railway systems. The party then travelled *via* Harding, Umzimkulu, Ixopo, and Richmond to Maritzburg in the course of which trip the question of further railway links between the coast and the interior was studied. Calls were made also at Greytown, Weenen, and Estcourt, which centres are interested in the conversion of the narrow gauge line to standard gauge.

KENYA & UGANDA

Exceptional Passenger Traffic

The principal event of H.H. the Aga Khan's Diamond Jubilee Celebrations was the ceremony of the weighing of the Aga Khan against diamonds in Dar es Salaam, which attracted some 10,000 visitors from Kenya & Uganda. In connection with this ceremony, four special trains were arranged, two from Kampala, the capital of Uganda, one from Kisumu on Lake Victoria, and one from Nairobi, each train carrying about 1,000 passengers. In addition many hundreds of the Aga Khan's followers made their way to Mombasa by the ordinary passenger services.

The main movement coincided with the clearance of European passengers bound for England on the passenger liner *Alcantara*. The boat train from Nairobi on July 28 carried 13 first and second class bogie coaches (picking up another at Voi), a bogie dining car and auxiliary, a bogie van for the spare crew, a bogie steel wagon for luggage, and two bogie brake vans. The total weight was 585 tons. There were also 200 British troops and 901 Italian internees to be moved at the same time.

EGYPT

Boiler Explosion on Cairo-Shellal Express

Shortly after midnight on July 25-26, while train 88, Cairo-Shellal express, was running between Etlidem and El-Roda at about 75 km.p.h., the boiler of the engine (2-6-0 No. 631) exploded. The front brake van, a sleeping car, a Pullman car, two first class coaches, and a second class coach were derailed. The rails at the spot of the explosion were badly twisted, and both up and down lines were blocked.

As a result of the accident the driver and fireman were killed instantly, a pointsman attached to the Mechanical Department was seriously injured, and the guard and brakeman of the train sustained slight injuries. Two children travelling on the train also were slightly injured. The down main line was cleared at 5.40 a.m. on July 27, when it was worked as single line between Etlidem and El-Roda. The accident is attributed to shortage of water in the boiler.

Cairo-Tobruk Service Restored

The weekly express passenger service between Cairo and Tobruk, which was cancelled as from June 4 as recorded in *The Railway Gazette* of July 19, was reinstated from July 21 on its previous schedule.

NEWFOUNDLAND

Railway Financial Position

The recently published "Report on the Financial & Economic Position of Newfoundland" shows that the Newfoundland Railway has incurred an annual loss averaging $107,000 between 1934-35 and 1939-40, except in 1936-37, when a surplus of $33,000 was registered. During most of the war an annual surplus was shown, reaching as much as $1,448,000 in 1941-42. This was the result of increased passenger and goods traffic and repair activity at St. John's Dockyard. Passenger receipts, $414,000 in 1938-39, rose to $1,571,000 in 1944-5, and goods receipts from $1,172,000 to $2,992,000 in the same period.

Nevertheless a deficit of $526,000 was incurred in 1944-45, and the accounts for the financial year 1945-46 and the estimate of expenditure make it clear that the Government will have to finance renewals. The estimated grant for renewals for 1946-47 is $270,000, in addition to a Treasury grant of $430,000 for capital improvements. Similar or larger grants will have to be made in future years to enable the railway to maintain efficient service. The Commission of Government has approved plans for three new steamships to replace three of the railway-operated vessels.

CANADA

Rail Safety Demonstration Car

A safety demonstration car, designed to give instruction to more than 27,000 men of the Canadian Pacific Railway on Eastern Lines, and also to children, was recently exhibited to the public at Windsor Station, Montreal. Railwaymen will be given visual instruction on rules, safety, first aid, and working methods, and the children will be shown sound films on safety and will hear lectures by C.P.R. safety agents. Formerly one of the company's ten hospital cars, which carried more than 5,700 wounded from seaboard to military hospitals across Canada during the war, the car contains the latest sound-film equipment, a two-way public address system, three sources of electric power, and seating accommodation for 60 persons.

UNITED STATES

Freight Rates Increase Sought

Hearings for a general increase in railway freight rates were resumed in Chicago on July 22 before the Interstate Commerce Commission. Dr. Julius H. Parmelee, Director, Bureau of Railway Economics, Association of American Railroads, the railways' first witness on the opening day, said that the railways expected to handle this year goods and passenger traffic heavier than in any previous year of peace, but far below that in wartime. The decline of traffic since the war, increased wages, and rising prices were the basis of the railway companies' claim for increased rates.

In the first five months of 1946 freight revenues were down $768 million, passenger revenues $102 million, and operating expenses only $85 million. If the excess of current assets over current liabilities continued to fall, their cash reserves soon would be exhausted. Were charges now revised to contribute the same proportion of the total value of various products as in 1941, freight rates would have to be raised 67 per cent. on farm products, 35 per cent. on food products, and an average of 16 per cent. on other freight traffic.

As reported in *The Railway Gazette* of July 5, the commission authorised as from July 1 an increase of 6 per cent. in certain freight rates (11 per cent, except for coal, iron ore and lignite, on Eastern lines). A motion that the present hearing be postponed so that the effect of the foregoing increases might be examined was denied.

DENMARK

Higher Rates and Fares

A law has been passed in the Danish Rigsdag increasing rates and fares on the Danish State Railways. Before the war the ordinary common class fare was 5 Øre per km. (about 1d. a mile) with first class 50 per cent. higher and with a reduction on return tickets of 25 per cent. During the war the fares were increased by 25 per cent., and now a further increase of about 20 per cent. has been imposed on all tickets except for suburban journeys (distances up to 30 km.), where the increase is only about 12 per cent. The goods rates, also, were raised during the war by 25 per cent., and are now made a further 10 per cent. higher. The increases came into force on August 1.

One of the reasons for these increases is that salaries and wages have been increased by law from April 1. The increases amount to about 8 per cent. for the higher grades, rising to about 16 per cent. for the lowest grades. The higher rates and fares are expected to give a further income of about 25 million kroner.

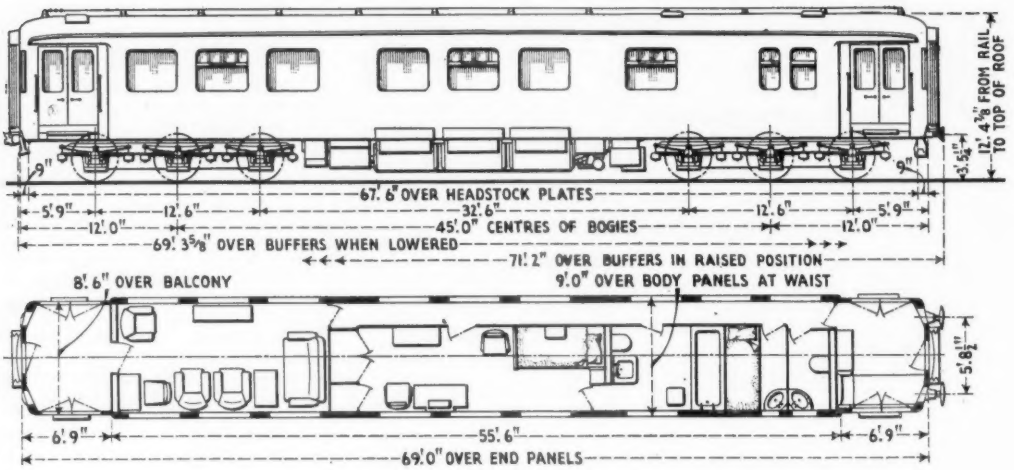
Fire on the Lillebelt Bridge

A fire broke out on the Lillebelt bridge on July 27. A spark from a locomotive ignited the wooden sleepers and the plank deck, but by means of the pumps installed in the piers the fire was soon extinguished without causing much damage. A few hours later a new fire broke out at another place, and this time the pumps would not work.

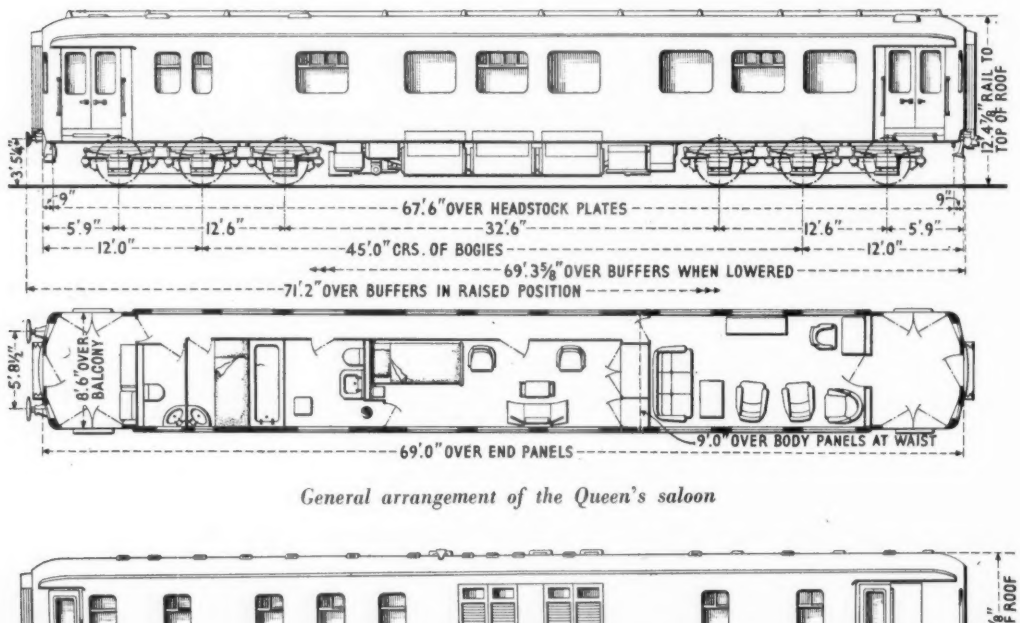
The fire was extinguished by fire engines from neighbouring towns. Where the first fire occurred the sleepers and plank deck were burned for a length of about 20 m., but at the second place the fire was more violent, the sleepers and plank deck being damaged under both tracks for about 30 m.; moreover, the rails and the girders supporting them were bent by the heat, and they cannot be used again.

While it is comparatively easy to replace the sleepers and planks, spares for replacing the girders are not available in Denmark, and must first be imported from Great Britain. Trains could not pass the bridge for several days, and passengers had to walk over the bridge. One track was repaired in about three days, but it is expected to be several months before both tracks are available again.

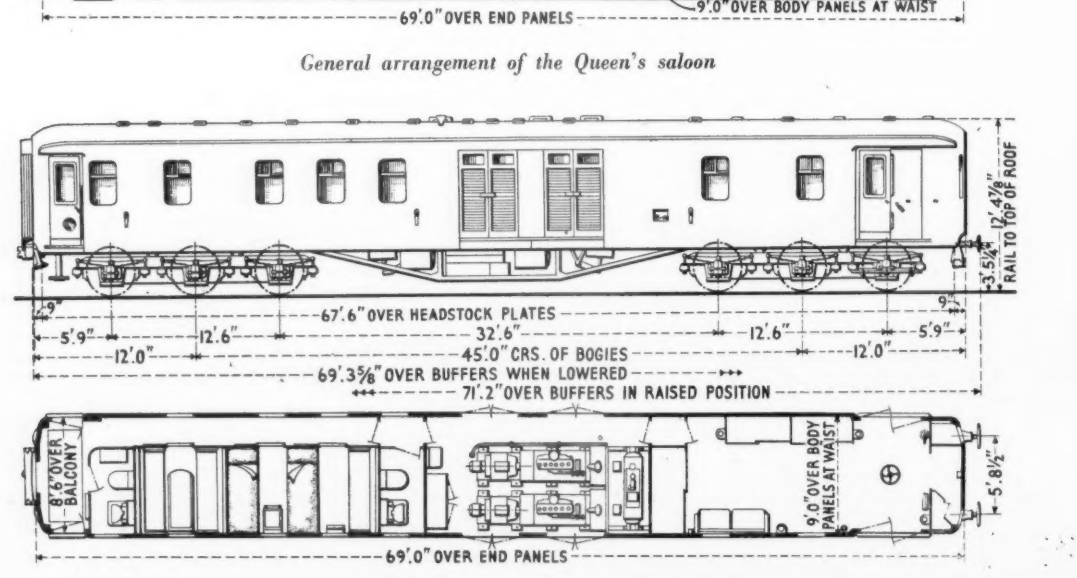
New Vehicles for the L.M.S.R. Royal Train



Principal dimensions and plan of the King's saloon on the Royal Train



General arrangement of the Queen's saloon



Dimensions and plan of the convertible sleeper, brake, and power car

New Vehicles for the L.M.S.R. Royal Train

A description of three cars constructed at the carriage works at Wolverton in 1941

FOR inclusion in the Royal Train, three new cars were constructed in 1941 at the Wolverton carriage works of the L.M.S.R., and were referred to briefly in *The Railway Gazette* last week. These cars comprise one saloon for the use of the King, one for the Queen, and a convertible sleeper, brake, and power car to provide accommodation for the train staff, generator sets, and luggage. The exteriors of the coaches are painted in standard L.M.S.R. colour.

The three vehicles are each 69 ft. long over body ends, and 9 ft. wide over side panels, and they are mounted on specially designed 6-wheel bogies with 10 in. × 5 in. dia. journals, the wheel tyres having a profile of 1 in 100. The weight of each saloon is 57 tons and the power car weighs 52 tons. Other principal dimensions are as shown on the diagrams on the opposite page.

General Arrangement of Saloons

The general arrangement of the two Royal saloons is similar, and provides in each case a lounge, bedroom, and bathroom, together with a sleeping berth compartment and lavatory for use of the valet and the maid respectively. In addition, spacious vestibule balcony ends are included with inward opening, and there are recessed double doors on both sides of each car.

The entrance doorways are at the lounge end of each saloon, and folding steps are fitted opposite the doors on both sides of the cars. These steps are operated by hand from outside the vehicles, and when in the open position, display an electric red warning light near the solebar, indicating that the steps in this position exceed the loading gauge. These lamps are also used for the purpose of illuminating the bottom steps.

The underframes and bogies are built up from mild-steel rolled sections electrically welded throughout. In the case of the two Royal saloons, the design of the underframes consists of two main centre longitudinal members of fabricated lattice girder type, with transverse steel angle-frame braces in order to carry the solebars.

To assist smooth running and reduce track noises, the top centre casting and side friction blocks are of a special design, with rubber shock-absorbing pads between the castings and the underframe. This elimination of metal-to-metal contact is completed by the use of rubber bushes on the securing bolts.

All underframe and bogie brakework details have hardened steel-bushed holes with machined pins, and care has been taken in the design and fitting up of the brakegear to prevent rattle. The automatic vacuum brake is fitted to all three cars, and each vehicle has two 24 in. dia. vacuum-brake cylinders, the brake on each bogie being operated by one cylinder, two blocks being fitted to each wheel. The power-brake car has also a hand brake operating on both bogies.

Pullman gangway equipment is fitted at both ends of each saloon, and hinged side buffers, the centre coupler being also hinged to enable the vehicles to work with carriages fitted with ordinary side buffing and screw-coupling drawgear. Rubber springs are used for buffing and drawgear, the side buffers having a special arrangement of shock-absorbing springs behind the headstock.

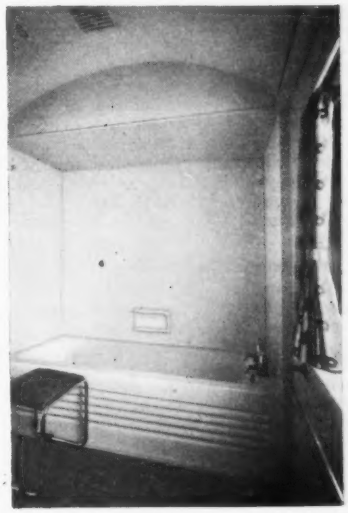
The fabricated bodies have steel angle and pillars, cantrails, and roofsticks. Pressed-steel sockets, welded to the solebars and cantrails, secure the bodyside teak pillars. The side, roof, and end panels are of No. 16 S.W.G. steel sheets with welded joints, thus making one complete panel from end to end.

Ventilation

The roof is constructed to permit a duct being fitted between it and the ceiling. This duct extends from side to side of the saloons for the distribution of conditioned air to all compartments, louvres being arranged along the sides immediately above the cornice for this purpose. The ducts are constructed of asbestos sheets 2 mm. thick to counteract changes in external temperature.

The outside shape of the roof was developed from a true semi-ellipse, the bodyside continuing tangential to the lower curve of the roof in such a manner that junctions of the various curves forming the external contour of the saloons were not visible. The ends of the roof, and the body ends, were also given a smooth, curved finish. The bodyside panels extend below the solebar level, forming a valance, and thus giving continuity of line.

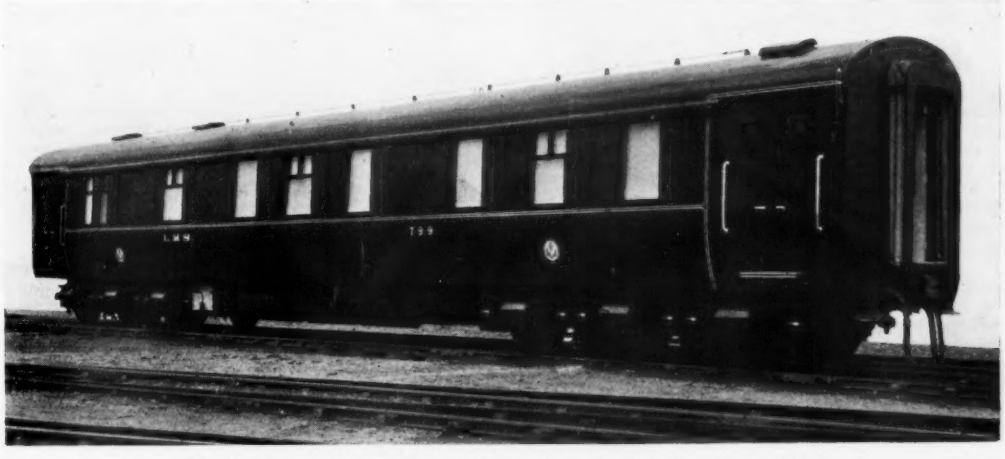
In the construction of the bodies, special attention was paid to the provision of insulation against sound and changes in external temperature. The inside face of the bodyside, roof, and end panels are sprayed with asbestos to a thickness of $\frac{3}{8}$ in., and an additional insulation blanket of limpet asbestos $\frac{1}{2}$ in. thick is fitted within the body framework between the outside steel panels and the interior finishing panels.



The King's bathroom in the Royal Train

The corrugated-steel floor sheets, welded to the underframe members, are sprayed on the underside with asbestos $\frac{1}{2}$ in. thick. The flooring consists of cork, $1\frac{1}{8}$ in. thick, on which is laid feltine paper and a thick underfelt to receive the carpets.

The quarter-lights, which are double glazed with $\frac{1}{4}$ in. thick toughened armour-plate glass, are arranged to have a $\frac{1}{2}$ in. space between the outer and inner glasses, between which is fitted a dehydrator to prevent dimming due to condensation.



The Queen's saloon with protection plate shutters in open position

XUM

The saloons are finished in multi-ply panelling extending from floor to cornice, each panel being bordered by sunken margins.

The skirtings are small, and quite plain, with little projection from the face of the panels. To prevent creaking, the back of the partitions and bodysides were covered with strips of fabric before the panelling was fixed in position, and fixing is so arranged that no screws or other securing devices are visible. The cornices are of small depth with considerable projection to cover the lower extremities of the air duct.

The compartment ceilings are of three-ply, faced with ivory white leather, arranged in rows of square panels, and bordered by half-round beadings which are also leather faced and flush with the ceiling face.

Not only does this particular arrangement form a unique scheme of decoration, but it also reduces resonance. The vestibule ceilings are of three-ply, arranged in panels with sunken margins, and in removable sections to give full access to the air-conditioning units, filters, and Pullman gangway control springs situated above.

Interior Saloon Decoration

The panelled walls of the lounge of the King's saloon are enamelled fawn, egg-shell finish, with sunken margins gloss-enamelled in off-white. The skirtings are of English walnut, cross-banded and polished clear matt, and the cornice moulds are painted to match the side wall panels, with the exception of the centre bead, which is gilded and burnished. The projecting window surrounds have a plain face, with a plain central sinking, and they have been enamelled to match the panel margins.

The two doors leading out of this compartment are of laminated plywood panels, the one giving access to the vestibule balcony being veneered with English walnut, and the recessed door frame is cross-banded to match the door, its projecting surround being relieved by a white holly inlay. The door opening into the corridor forms one of the group of panels on the adjoining cross-partition.

Weathered sycamore is used for the interior decoration and furniture of the King's bedroom, the former being relieved by a white holly inlay along the centre of the cornice. Here, also, the doors are arranged to form part of the wall panelling. The metalwork is brass-finished copper, with the door handles ivory white, and the electric light fittings copper and silver.

The Queen's Saloon

The compartments of the Queen's saloon are of similar layout and furnished in a like manner. The interior decoration has also been carried out on the same principle with a variation in the colour schemes. The lounge is enamelled pale grey, with the panel margin sinkings white gloss-enamel, the recessed margins having two half-round beads of finished burnished silver.

The interior finishing of the Queen's bedroom is carried out on similar lines to that of the lounge, except that the sunken panel margins are plain. The doors are incorporated in the panelling, the whole finished in pale Worcester blue egg-shell lacriete enamel, with the sunken margins enamelled white. The carpet is mulberry in colour.

The extensive use of electricity for lighting, heating, ventilating, etc., combined with the exceptional conditions under which the Royal Train frequently operates, made a departure from standard railway practice desirable.

In place of the customary axle-driven generators, the electricity supply is furnished by a power plant installed in the convertible sleeper, brake, and power car specially designed for this purpose. Cables connected to this car traverse all the coaches of the train, and provide an electricity supply in the same manner as a normal distribution system.

The generating plant consists of two internal-combustion engines direct-coupled to 35 kVA. 3-phase alternators operating at 250 V., 50 cycles, with overhung exciters.

Vibration is isolated from the coach by Silentbloc mountings supporting the plant on the underframe. Each equipment has an electric starter of the motor-car type, complete with battery, charging dynamo, and voltage regulator.

Engine and alternator, together with radiators for water and oil cooling, starting equipment, etc., are constructed as a unit, and can be inserted or withdrawn from the coach without dismantling. Belt-driven fans draw cooling air through the louvred sides of the coach, and, after passing over the radiators, discharge it to the track *via* openings in the floor. Engine exhaust is through the coach roof by way of double silencers.

Sensitive engine governors, in conjunction with automatic regulators, control the output of the generators, and dispense with the necessity for constant supervision. Fuel is stored in a tank in a protected position within the coach underframe, from which it is lifted by engine-driven pumps.

A switch panel containing protective and control-gear indicating instruments and meters is mounted adjacent to the generating sets.

Emergency Lighting

Lighting is at 50 volts a.c. through a 250/50 V., 3-phase transformer mounted on each saloon. There are three independent secondary windings, the maximum voltage to earth being limited to 25 by earth-connected centre taps. The lighting circuits are distributed between the three secondary windings, one of which is associated with an automatic changeover contactor and storage battery. Failure of the main electricity supply causes the lamps connected to this emergency circuit to be automatically fed from the battery through the instantaneous switching of the contactor.

Communication is through three independent installations, namely, a private telephone system, a buzzer-call signal system for the staff, and a train telephone installation. The private installation is fed from the 50 V. emergency battery and operates through two groups of relays. Calls cannot be initiated by the personal attendants and the privacy of all conversation is assured.

Throughout the Royal Train communication is secured by a 25-line automatic telephone exchange of standard post office pattern housed in the brake and power car. Microphone current is taken from the emergency battery of the coach on which the exchange is installed. Attention has been paid to the suppression of side-tone to secure maximum intelligibility.

Communication between the train guard and the locomotive crew is secured by loud-speaking telephones, and calling is both by a high-pitch note and visual luminous signal. In this case, also, operating current is obtained from the emergency battery, the locomotive instrument being so arranged that it can be readily transferred from one engine to another.

The Royal saloons are air conditioned, steam and electricity being used jointly as the heating medium, and wet ice for cooling purposes. There are two conditioning units per saloon, housed above the ceilings of the vestibules at each end of the coach, one unit dealing with the lounge portion of the saloons, and the other with the remainder of the car, except the vestibules; heating of the latter is by steam radiators.

A Choice of Six Temperatures

A choice of six temperatures may be made in both the heating and cooling cycles, and the temperature is automatically maintained by thermostats. Fresh air is drawn from below the floor of the saloon through a duct in the vestibule partitions, and, after passing through air filters, is drawn by electrically-driven fan over the heating or cooling coils and thence propelled into a duct above the ceiling. From this duct, air is distributed through louvres exetnding the full length of the conditioned portion of the saloon, at ceiling height, on both sides of the coach.

The air passes out of the compartments *via* louvres at the foot of the doors and *via* grilles at ceiling height. Part of the air is exhausted to atmosphere through roof vents, and part returns to the units for re-circulation after passing through air filters of the viscous oil type. The lounge is supplied with a complete change of fresh air about every four minutes, and the remainder of the compartments approximately every six minutes.

Steam for air heating is furnished by the train locomotive, and admission to the air heater is through a thermostatically-controlled motor-operated valve. To secure complete comfort conditions at floor level, each saloon is equipped with electrically heated panels, designed to project heat rays across the floor of the compartments. Thermostatic control is applied through contactors mounted on the underframe.

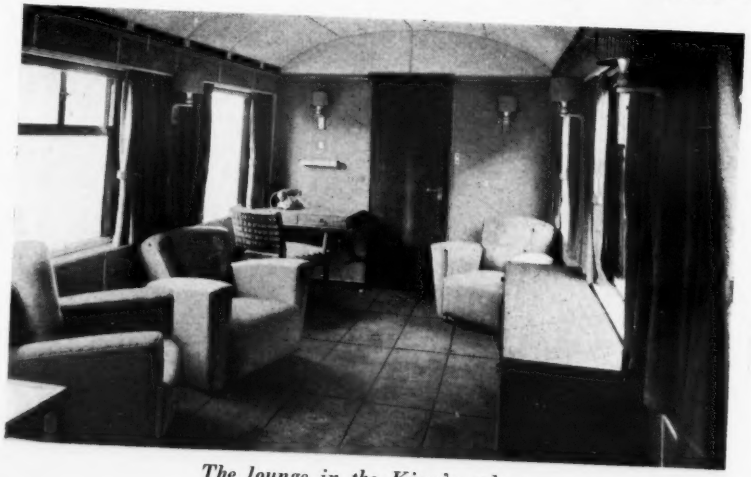
Ice for cooling is stored in heat-insulated bunkers on the underframe. From these bunkers ice-cooled water is circulated through the air-cooling coils in the conditioning units above the vestibule ceilings by electrically-driven pumps mounted on the underframe. The water returning from the coils is sprayed over the ice in the bunkers before performing again the same cycle.

Hot water supply to the bath and wash basins of each saloon is by a steam calorifier, lagged to retain heat, and mounted on the underframe. The cold water service is provided *via* tanks from which all services, including the calorifiers, are gravity fed.

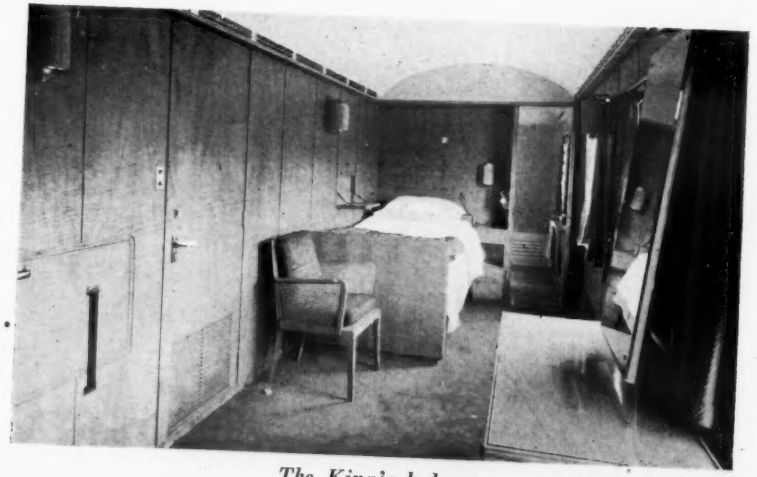
Sleeper, Brake, and Power Car

The convertible sleeper, brake, and power car is primarily a service vehicle which can be marshalled either at the rear or front of the train. It has three and a half compartments convertible to day or night use, giving sleeping accommodation for 14 train staff, and there are two lavatory compartments, engine room for generator sets, and a brake compartment giving additional luggage space, together

New Vehicles for the L.M.S.R. Royal Train

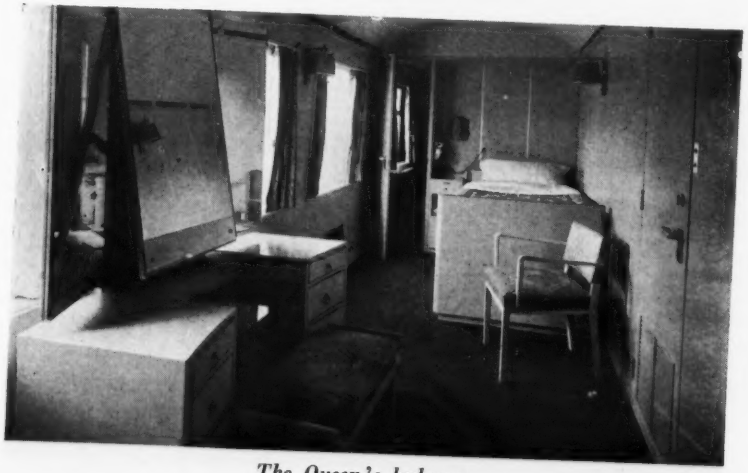


The lounge in the King's saloon



The King's bedroom

The lounge in the Queen's saloon



The Queen's bedroom

Engineering Library

Part of the brake and luggage compartment of the convertible sleeper, brake, and power car of the Royal Train

with built-in cupboards. One of the latter, for the storage of linen, is steam heated.

Spare parts for train maintenance are also carried in this compartment. An entrance lobby with inward opening recessed bodyside doors is provided at the passenger end of the car. Pullman gangway equipment and hinged side buffers are fitted to the passenger end of the car similar to those on the two Royal saloons. The brake end is not fitted with a gangway, but centre coupler and hinged side buffers are provided.

The 6-wheel bogies are of similar design to those fitted under the two Royal saloons and the general principle of construction of the body also follows on similar lines. Steel angle pillars are used in the construction of the end framing.

Corrugated steel sheets welded to the underframe form the floor for the berths, corridor, and lobby end, with cork 1⅜ in. thick laid on the top, the latter being covered with felt and linoleum. The underside of the steel floor sheets is also sprayed with asbestos. The engine room floor is made up of ¼ in. steel chequered plates which are welded to the underframe members.

To facilitate complete examination and overhaul of the generator sets, the body sides of the engine-room compartment are fitted with four steel louvred hinged doors, the portion of the bodyside framing between each pair of doors being removable.

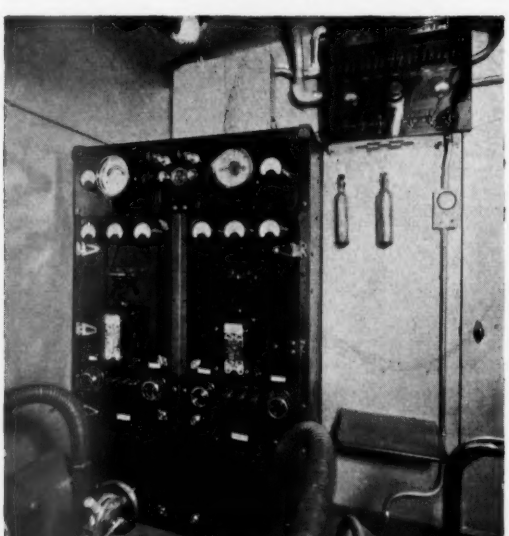
Generator Set Maintenance

Simply by hinging back the two outer doors, removing the two inner hinged doors together with the detachable portion of bodyside framing, a clear opening of 10 ft. 6 in. by 6 ft. 3 in. can be obtained for the purpose of removing the generating sets.

The engine-room compartment walls and ceiling are lined with asbestos and covered with sheet metal. In addition, the two cross-partitions are fitted with a 2-in. thick sound and fireproof insulation, and there is also an insulated sound-trap door in the corridor, situated beyond the adjoining lavatory to prevent engine noises being transmitted down the train.

MEXICAN SOUTHERN RAILWAY LIMITED—A general meeting of the members of the Mexican Southern Railway Limited will be held at 112-114, Cannon Street, London, E.C.4, on September 30, at 10 a.m., for the purpose of having an account laid before them, and to receive the liquidators' report showing how the winding-up of the company has been conducted and the property of the company disposed of, and of hearing any explanation which may be given by the liquidators; also of determining by extraordinary resolution the manner in which the books, accounts, and documents of the company, and of the liquidators thereof, shall be disposed of.

The engine and generator units



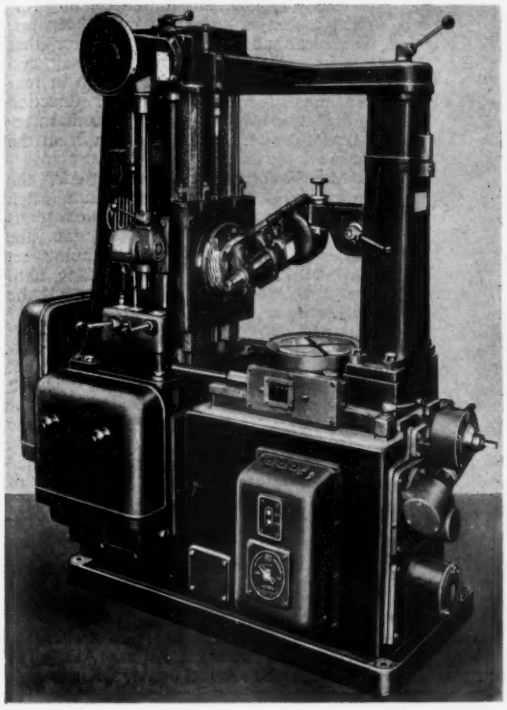
Control panel in the brake and power car

New Moving Head and Moving Table Hobbing Machines

Two new ranges of machine tools for cutting precision gears

A HIGH degree of accuracy is the first requisite in any hobbing machine, and this aim has been pursued by Muir Machine Tools Limited, Manchester, a subsidiary of David Brown & Sons (Huddersfield) Limited; in the recent introduction of new types of moving table and moving head hobbing machines.

The moving table hobbing machines are made in three sizes, to suit hobbed spur gear diameters ranging from 15 in. to 50 in. The maker claims that the master gear-cutting machine for cutting the worm wheel "is probably the most accurate machine in the country, and is housed in a separate room where a constant temperature is maintained." All dividing worm wheels are cut in position with their own spindles, and are carefully checked for adjacent, accumulative, and profile errors. Special means are also employed to ensure the highest accuracy in the lead screw.



Muir moving table hobbing machine for the production of spur, helical, and worm gears

The bed is of seasoned cast iron, with the centre inclined to form a chute for cuttings and coolant. The rear of the bed carries the main gearing, including the differential and the driving shafts; all gearing is totally enclosed and runs in oil. The dividing, feed, spiralling, and change gearboxes are conveniently carried at the back and side of the bed, and are so housed as to accommodate spray lubrication from an automatic pressure pump.

The table, which carries the worm wheel, is spigotted by a large-diameter cone running in the cradle and bottom slide, and is designed so that cuttings and coolant are carried through the table into the bed. The mechanism is totally enclosed and runs in an oil bath.

The hob slide, designed to have minimum overhang, can be rotated through 180 deg. for spur and spiral gears. The hob spindle drive is by spiral bevels to profile-ground spur gears, the driven member of which is of flywheel design, and is fitted on to the splined end of the spindle. This latter gear is fitted with a friction band to damp vibration, and the spindle is fitted with thrust washers and locknuts to minimise end float.

Vee belts transmit the drive from an electric motor to the pick-off gears for changing the hob speed. The spiralling gear is operated from the vertical feed through gears on a segment plate to a differential gear mounted in the drive of the machine. The feed can be stopped, started, or changed without affecting the helix angle of the gear being cut. Feed change is by pick-off gears and a sliding gear which gives two changes of feed for each set-up of the pick-off gears. All machines are fitted with a power-operated quick traverse to the hob slide.

An automatic in-feed mechanism can be supplied as an optional extra. This enables worm wheels to be cut using the standard hob slide, but this can be used only with parallel hobs. A travelling slide with tangential feed can be supplied if desired, to enable worm wheels to be cut by means of a taper hob or by a fly cutter.

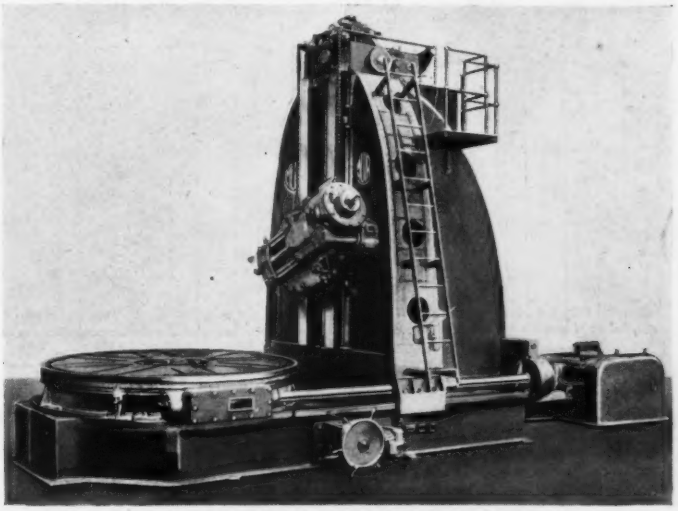
The three machines in this series have table diameters of 12½ in., 26 in., and 40 in., the respective ratings of the main motors being 3, 5, and 7½ h.p.

The much larger moving head hobbing machines, of which also there are three sizes in the new series, have been designed to cut gears of large size such as those required for land or marine turbine installations. Both large- and small-diameter gears can be cut on these machines, a characteristic secured by widening the bed and the base of the upright so that the latter partially embraces the table when standing over to cut pinions and small gears. The feed screw for the hob slide is of the rotating type; the hob slide itself, of ample width, carries the spiral bevels which transmit the motion to the hob spindle. The latter runs in phosphor-bronze bearings.

All the gearing for the table, hob drive, and feed screw is carried in a self-contained gearbox, and all is totally enclosed, running in oil. Pick-off and change gears for the hob speed, spiralling, dividing, prime, and feed are provided, and removable covers give easy access. Three changes for the hob feed are provided, in addition to the pick-off gears. Wheels of different numbers of teeth, but having the same helix angle, can be cut without changing the spiralling gear.

To facilitate the cutting of wheels after they are mounted on their shafts, the table is provided with a large bore. The drive consists of a master worm wheel and driving worm only. The worm wheel has a large number of teeth of comparatively fine pitch to minimise the pitch of the undulations caused by wave error. A prime gear drive can also be incorporated, which adds or subtracts up to five to or from the number of teeth for which the dividing gears are set by the change gears. A quick power traverse is provided for the column and the hob slide in both directions. Automatic starters are fitted for main and auxiliary motors; a remote control push-button station is provided.

The maximum diameters of gears with 30-deg. spiral angle which can be cut on these machines are 100, 150, and 200 in. for the three sizes. The corresponding minimum diameters are 30, 36, and 72 in. The maker states that, while regarding the solid-table machine as the present-day standard, machines with cradles of the "creep" type can also be supplied.



Muir moving head hobbing machine

XUM

An Advance Section Signalling Device

Last vehicle detector apparatus recently installed on certain sections of the Metre-Gauge System of the Bombay, Baroda & Central India Railway

By H. C. Towers, M.I.E.E., M.I.R.S.E., M.Inst.T.
Signal Engineer, Metre-Gauge System, B.B. & C.I.R.

Brake van passing over ramp, showing original design of ramp and contact brush

MAIL, express, and passenger trains on the B.B. & C.I.R. are fully equipped with automatic vacuum brakes, but goods trains are only partly equipped. Where gradients are such that the parting of a goods train might result in the rear portion running back out of control, certain rules are in operation, and the type of rule applied is governed in every case by the gradient, curvature, and other conditions. These rules are given code letters as below:—

"A"—On sections marked "A" in the working book the prompt and correct application of the guard's hand brake is necessary to ensure the stoppage of the parted portion within the section. For this reason, guards must exercise extra caution and care.

"AB"—On sections marked "AB" the following additional precautions to those laid down in "A" must be taken: The station in rear must not permit any shunting beyond the home signal at the end nearest to the departing non-braked train until that train has arrived complete at the station in advance.

"AC"—On sections marked "AC" there is a loop line at the station in rear provided with trap points or dead-end. This line must be kept reserved for the reception of any breakaway portion, while the points at the end nearest to the departing non-braked train must be set to lie for it, and the trap or dead-end points at the further end must be set to derail or receive the runaway portion if out of control. A following train should be detained at the outer until the non-braked train has arrived complete at the station in advance.

"AD"—On sections marked "AD," as a parted portion is liable to run back through a station and into the block section in rear, even if hand brakes are properly applied, the station sending forward a non-braked train must keep one line clear and the points set for that line in order to pass any breakaway, and must also keep the block section in rear of trains unoccupied in either direction until "train out of section" has been received for the non-braked train from the station in advance.

"AE"—On sections marked "AE," the station in rear is provided with a catch siding. In addition to the precautions laid down for an "AB" section, the station in rear must keep the points set and the line clear for that siding until the non-braked train has reached the station in advance.

Difficulties of Working

It will be seen from the foregoing that the capacity of the line is reduced considerably in the cases of sections "AC" and "AD," as in the former case a following train can be accepted only up to the outer signal, and not admitted into the station section until "train out of section" is received for the forward section; and in the latter case a following train cannot be accepted from the station in rear until the forward section is clear.

Fig. 1 shows an index section and line diagram for the portion of the main line, Mandavrya to Ladpura. Both sections Mandavrya to Kishengarh, and Kishengarh to Gegal Akhri, are classed as "AD." The portion of the section between Kishengarh and Gegal Akhri classified as "AD" for up trains is the gradient of 1 in 150 up,

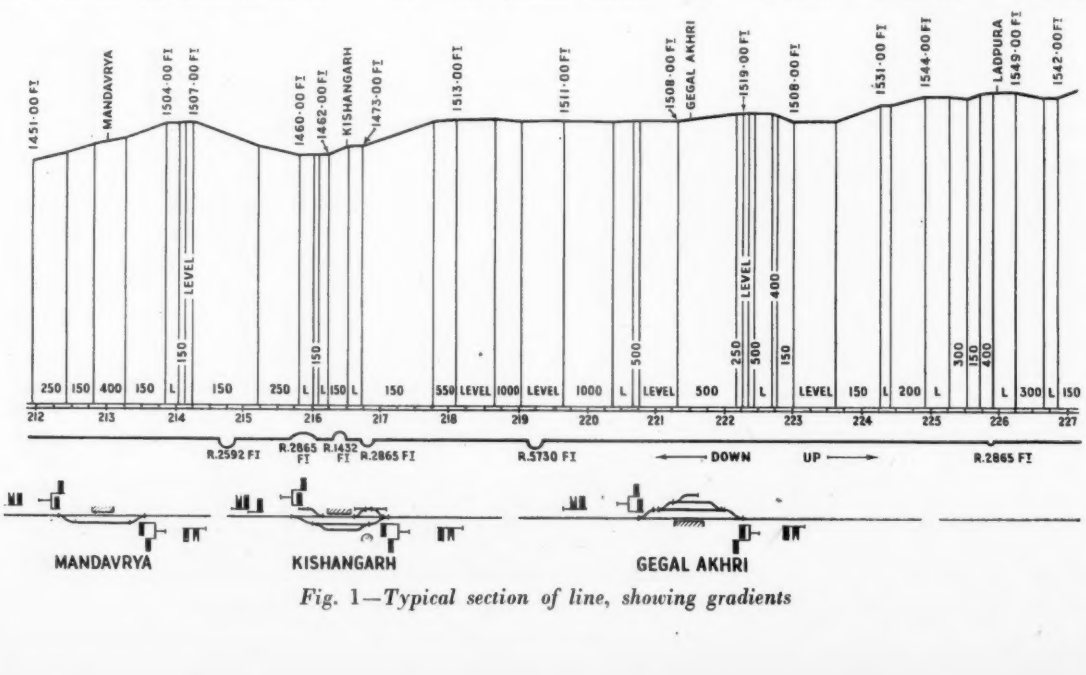


Fig. 1—Typical section of line, showing gradients

which begins just outside the down home signals and extends for a distance of one mile, when the grade changes to 1 in 550 for a short distance and then to level track. Because the section is classed as "AD," however, a following train has to be detained at Mandavrya until the preceding train has arrived at Gegal Akhri complete. This is a distance of about four miles beyond the point where the advance section ceases to be effective.

As there are many such sections on the metre-gauge system, some much longer than the case cited, it was decided to design a device whereby the stationmaster could be informed when a goods train had arrived at the top of the gradient *complete*. This could have been accomplished easily by track circuiting the gradient, but in India steel trough sleepers are extensively used, and the policy is to replace wooden sleepers with steel sleepers when replacements are due.

Wholesale substitution of steel sleepers with wooden sleepers, where track circuits are required, is not favoured, so that generally track circuits are possible only in station limits or for very short distances between stations where automatic bell warning for level crossings is required. The problem was, therefore, to design a reliable device which would act as a *last vehicle detector*. Wheel-counting apparatus had not been heard of during the war, and in all probability experiments in that line had had to be abandoned because of war work.

The Last Vehicle Detector

At a short distance beyond the termination of the up grade, two steel plates are fixed between the rails. The plates are about 3 in. apart and are mounted on a wooden structure so as to be situated 1 in. above rail level. They are about 25 ft. long, and their approach is slightly ramped.

The appliance fixed to the last vehicle (Fig. 2) consists of a pair of small steel brushes attached to a clamp which slides

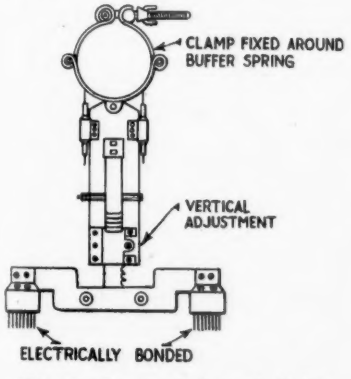


Fig. 2—Latest design of double brush for attaching to rear vehicle

over the rear buffer casting, and is locked in position by a pin. The steel brushes are bonded to each other to ensure perfect electrical continuity. Owing to variations in buffer heights, it was not possible to design a brush that would guarantee contact with the metal plates for every rear vehicle. A brush with adjustment had to be designed. This was achieved by permitting the brush to have a vertical movement by means of a rack and locking device.

The station at which the brush is to be applied is provided with a gauge, consisting of a flat steel bar which is laid across the rails. In the centre are two blocks of steel ½ in. lower than the height of the metal plates. The brush is allowed to rest on these blocks, in which position

Stationmaster operating plunger to stop bell signal after a train has climbed the gradient

it is locked. It can now engage the plates with ½ in. to spare. The brush is pivoted so that it can swing outwards, but this movement is under the control of a powerful spring. The approach to the plates is ramped so that the brushes gradually come into contact with them and the spring causes them to exert a powerful pressure on the surface of the plates so that any skin resistance is completely broken down.

The joining of the two metal plates by the bonded brushes completes an electrical circuit which picks up a stick relay at the rear station and causes a loud ringing electric bell to operate. This bell continues to ring until the stationmaster presses a plunger. He can now accept a train from the rear section. Timings under usual advance section working and advance section working with new signalling device are given below, providing a clear idea of the amount of time now being saved.

Assume an up goods train departing from Kishengarh for Gegal Akhri while another is waiting at Mangavrya:—

OLD CONDITIONS

	Kishengarh		Gegal Akhri
First goods train departs ...	8.55	arrives	9.20
"Line clear" sent to Mandavrya for following goods train	9.23*		

* 3 min. allowed for block operation

NEW CONDITIONS

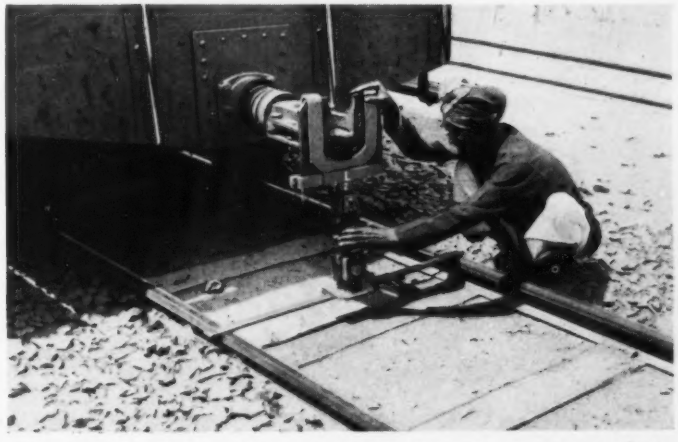
	Kishengarh	Time bell rings in Kishengarh Station
First goods train departs ...	8.55	9.7
"Line clear" sent to Mandavrya for following goods trains	9.10†	

† Goods train permitted to follow 13 min. earlier than if advance section device was not installed

Safety Precautions

The metal plates are quite inoperative by gangmen gauging the line, or unauthorised persons, such as cattle boys, deliberately joining the plates together by wire. The portion of track on which the ramp is situated is divided into two small track circuits, each of one rail length. These track circuits have to be occupied by a train before the metal plates can be connected to the line circuit. They serve also as a detector for chains, hanging brake rods, and so on. In the case of such parts hanging down from the train and accidentally connecting the two plates, no current impulse is sent to line because the first track circuit is still occupied by vehicles and the line is disconnected.

It was not possible to use brass or copper for the plates because the ramps are situated in lonely places and such metals are a great attraction to thieves. As it is, the steel plates are riveted through the wooden mounting so that they cannot be prised up by chisel, screwdriver, or other tool. The same remarks apply also to the steel brushes. Were they made of copper, they would soon be stolen.



Adjusting the brush to the correct height for making contact with the ramp

On the train arriving at the next station,

(*Continued on page* 249)

The Potters Bar, L.N.E.R., Accident

Aerial view of the scene after the Kings Cross to Edinburgh express had struck a derailed train at Potters Bar
(see Ministry of Transport Inspecting Officer's report on page 250)

RAILWAY NEWS SECTION

PERSONAL

Mr. J. F. Dawson has had, on medical advice, to resign his appointment as Managing Director of G. D. Peters & Co. Ltd., but will remain as Deputy-Chairman. Mr. J. E. Blackshaw and Mr. R. Needham have been appointed Joint Managing Directors.

Mr. A. W. Browne has been elected Chairman of the Chloride Electrical Storage Co. Ltd. Mr. W. S. Naylor, who has filled the post for many years, retains his seat on the board.

WESTINGHOUSE BRAKE & SIGNAL CO. LTD.

London Office

Mr. W. M. Shorter has been appointed Deputy General Sales Manager.

Mr. C. F. D. Venning has been appointed Commercial Manager (Signal & Colliery Department).

Mr. F. G. Hathaway and Mr. F. T. Tresize have been appointed Sales Engineers (Signal & Colliery Department).

Chippenham Factory

Mr. P. Cruse has been appointed Deputy General Works Manager.

Mr. J. Powell, Assistant District Goods Manager, Swansea, Great Western Railway, who has been appointed Assistant District Goods Manager, London, joined the company at Cardiff Goods Station in 1920. After service there and with the Goods and Traffic Departments in the Plymouth and Exeter Districts, he was appointed Junior Assistant to the London District Goods Manager in 1935. In 1937 he was promoted Chief Clerk to the London District Goods Manager, and in 1943 was placed in charge of Smithfield Goods Station. In September of the same year Mr. Powell was appointed Assistant District Goods Manager, Swansea, which position he vacates on his new appointment.

Mr. William Griffiths, Goods Agent, Swansea, Great Western Railway, who has been appointed Assistant District Goods Manager, Swansea, joined the company in 1920 at Shrewsbury. In 1929 he was selected for special training, and on its completion was appointed to the Pooling Section, Chief Goods Manager's Office. In 1934 he was appointed Personal Clerk to the Chief Goods Manager, and in 1938 was transferred to the Traffic Research Section at Paddington. At the outbreak of war he was appointed Goods Agent, Slough, and was responsible there for the setting up of an organisation to deal with Canadian Red Cross Supplies, which services were recognised by his being made an honorary member of the Canadian Red Cross Society. In 1941 Mr. Griffiths was appointed Chief Clerk to the Paddington Goods Superintendent, and two years later Chief Clerk, Cardiff District Goods Manager's Office. In 1944 he was appointed Goods Agent, Swansea, which position he vacates on his new appointment.

Major Oscar Loewenthal, C.B.E., whose death we recorded last week, retired on July 1, 1944, from the local committees and the General Managerships of the Buenos Ayres Great Southern Railway Co. Ltd. and Buenos Ayres Western Railway Limited, and from his other railway activities in Argentina. He was born on March 5, 1880, and was educated at Acton Collegiate School, Zürich Technical College and the University of Geneva. Thereafter

The late Major Oscar Loewenthal
General Manager, Buenos Ayres Great Southern and Western Railways, 1939-44

he held successive appointments as Assistant Engineer with the Tehuantepec Isthmus Railway (Mexico) and National Railways of Mexico; Chief Construction Engineer of the Real del Monte Mining Company (Mexico); and as Construction Engineer with the North Western of Brazil Railway, Leopoldina Railway and Port of Victoria Railway (Brazil). After occupying the position of New Works Engineer, Buenos Ayres Great Southern Railway, he was appointed Chief Engineer & Deputy General Manager, Madeira-Mamoré Railway (Brazil). He then became General Manager, Southern San Paulo Railway, and later General Manager, Argentine and Chilian Transandine Railways. In 1929 he was appointed General Manager of the Entre Rios and Argentine North Eastern Railways, and in 1936 he became Manager of the Buenos Ayres Great Southern and Western Railways. He was appointed General Manager of those railways in 1939. At the time of his retirement Major Loewenthal was a member of the British-Argentine Railway Committee; a local representative of the Buenos Ayres Midland Railway Co. Ltd.; General Manager, and a member of the local board, of the Bahia Blanca & North Western Railway Co. Ltd.; and Vice-President of the Buenos Aires Central Railway. During the war of 1914-18 Major Loewenthal served in France with the Royal Engineers, and later as officer in charge of the construction of Admiralty National Shipyard No. 1; subsequently he was Technical Adviser to the Managing Director of the Admiralty National Shipyards. Major Loewenthal was made a Commander of the Order of the British Empire in the King's Birthday Honours List, 1944.

Mr. T. H. Marston, Chief Clerk, Royal Mint Street, L.N.E.R., has been appointed Goods Agent, North Woolwich & Silvertown, in succession to Mr. F. J. Watson, who has retired.

Among those on whom the Bronze Star Medal has been conferred by the President of the U.S.A., in recognition of distinguished services in the cause of the Allies, is Brigadier (temporary) C. G. B. Greaves, R.E.

SOUTHERN RAILWAY STAFF CHANGES

Mr. F. Mundy, Acting Outdoor Machinery Assistant, Waterloo, Chief Civil Engineer's Department, has been appointed Outdoor Machinery Assistant.

Mr. E. V. Brady, Assistant Divisional Engineer, Western Division, has been appointed Divisional Engineer, Western Division, *vice* Mr. W. H. Shortt, who retires on September 30.

Mr. R. A. Hamnett, Assistant to Divisional Engineer, Western Division, has been appointed Assistant Divisional Engineer, Western Division.

Mr. G. W. French has been appointed Agent, Jersey (Docks & Marine Department), in succession to Mr. W. M. le Brun, who retires on October 1.

Mr. W. E. Hardisty has been appointed Agent, St. Malo (Traffic Department).

Mr. E. W. H. Powell, Assistant District Goods Manager, Wolverhampton, L.M.S.R., who, as recorded in our August 2 issue, has been appointed Assistant to Chief Commercial Manager (Goods), Watford H.Q., joined the L.N.W.R. in 1911. From 1914 to 1919 he served in H.M. Forces with the infantry, the Royal Tank Corps, and on the General Staff. On returning from the Army in August, 1919, he continued his railway training at Bletchley Station, and in December of the same year was appointed Junior Assistant to the District Goods Manager, Northampton; he subsequently held similar positions at Warrington, Birmingham, Lancaster and Barrow. In 1927 he was appointed District Traffic Agent at Whitehaven. Mr. Powell was attached to the Chief Goods Manager's Office, Euston, in 1930, on special work in connection with mechanical appliances; and subsequently was appointed Headquarters' Inspector to the Chief Operating Manager, Euston. In 1935 he became Goods Agent at North-

XUM

Mr. E. W. H. Powell

Appointed Assistant to Chief Commercial Manager (Goods), L.M.S.R.

Mr. L. Preston

Appointed Chief Assistant (Signals), Engineer's Office, London, L.N.E.R.

Mr. E. G. Brentnall

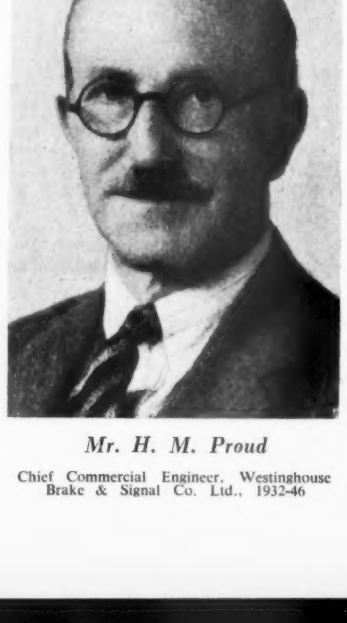
Appointed Assistant to Engineer (Signals), Edinburgh, L.N.E.R.

ampton, and he held a similar position at Liverpool Road, Manchester, from March, 1944. He was appointed Assistant District Goods Manager, Wolverhampton, in December, 1944.

Mr. L. Preston, Assistant to Engineer (Signals), Edinburgh, L.N.E.R., who, as recorded in our August 2 issue, has been appointed Chief Assistant (Signals), Engineer's Office, London, joined the Great Eastern Railway in 1906 and was trained in telegraphy, telephony, and power and signal engineering. He was appointed to the technical staff of the Electrical Engineer's Department in 1912, and afterwards was transferred to the Signal Department as Electrical Assistant; subsequently he was appointed Indoor Assistant to the Telegraph Superintendent. On the amalgamation of the Signal and Telegraph Departments of the Southern Area, L.N.E.R., in 1929, Mr. Preston became Chief Technical Assistant to the Signal & Telegraph Engineer. He was appointed Assistant Signal & Telegraph Engineer, Southern Area, in 1936, and Acting Assistant to Engineer (Signals), Edinburgh, in August, 1943, in which position he was subsequently confirmed.

Mr. E. G. Brentnall, B.E.M., M.Eng., A.M.Inst.C.E., A.M.I.E.E., M.I.R.S.E., Chief Assistant (Signals), Engineer's Office, London, L.N.E.R., who, as recorded in our August 2 issue, has been appointed Assistant to Engineer (Signals), Edinburgh, was educated at Heanor Grammar School and at Sheffield University, where he graduated with first class honours. In 1924 he was appointed Junior Assistant, Sheffield District Engineer's Office, L.N.E.R. In 1926 he became Assistant, Signal & Telegraph Engineer's Office, York, and in 1929 Electrical Assistant to Signal & Telegraph Engineer, North Eastern Area. He was engaged on signalling works of all types, among them the York—Northallerton re-signalling. In 1936 Mr. Brentnall was appointed Chief Technical Assistant to Signal & Telegraph Engineer, Southern Area, and in 1937 Outdoor Assistant to Signal & Telegraph Engineer, Southern Area. In 1943 he became Chief Assistant (Signals), Southern Area. During 1940-44, Mr. Brentnall was responsible for the restoration of signalling and communications after aerial attack; he was awarded the British Empire Medal in that connection. From 1932-36 he was lecturer in mechanical and electrical engineering at York Technical College; and in 1939-40 he collaborated in the preparation of the text book "Railway Signalling and Communications." Since 1939 he has been Chairman of an R.C.H. sub-committee engaged in the preparation of standard specifications for railway signalling specifications. Mr. Brentnall is a Member of Council of the Institution of Railway Signal Engineers.

Mr. H. M. Proud, M.I.R.S.E., Chief Commercial Engineer, Westinghouse Brake & Signal Co. Ltd., whose retirement is announced, was educated at the High School, Brentwood, Essex, and the City & Guilds Technical College, Finsbury. He served an apprenticeship to the Scientific Appliance Company, and later was a sub-



Mr. H. M. Proud

Chief Commercial Engineer, Westinghouse Brake & Signal Co. Ltd., 1932-46

station attendant on the London United Tramways and Central London Railway. Mr. Proud was one of a group of young electrical engineers recruited for the electrical portion of the installation work occasioned by the re-signalling of the District Railway and the signalling of the tube railways then under construction. At the conclusion of the construction period he was in charge of all the electrical construction staff. The McKenzie, Holland & Westinghouse Power Signal Co. Ltd. was formed in 1907, and shortly afterwards obtained contracts for the re-signalling of the Metropolitan Railway; Mr. Proud joined the staff of McKenzie & Holland Limited to supervise the outside construction work, reporting to Mr. R. S. Griffiths. Mr. Proud brought to the service of the company some 10 years' practical workshop, electrical and power signalling experience, to which he has since added 38 years in the service of the companies now forming the Westinghouse Brake & Signal Co. Ltd. Early in 1914 Mr. Proud joined the McKenzie, Holland & Westinghouse Power Signal Co. Ltd., in charge of estimating and construction. In 1916 he was appointed Signal Engineer to that company, and, in 1932, Chief Commercial Engineer to the Westinghouse Brake & Signal Co. Ltd. He visited many Continental countries, as well as the U.S.A., New Zealand, all the states of Australia, South Africa and Brazil. He was made a Member of Council of the Institution of Railway Signal Engineers in 1920. He became a member of the Three-position Signalling Committee (1922), the recommendations of which, at that time new, have since been largely applied to modern British railway practice. Mr. Proud was President of the Institution in 1937. He is also a Life Member of the Permanent Way Institution.

Mr. M. B. Thomas, Assistant District Goods Manager, Leeds, L.N.E.R., who, as recorded in our August 23 issue, has been appointed Assistant Advertising Manager, was educated at Christ's Hospital and joined the L.N.E.R. as a traffic apprentice in 1924. After occupying various posts he was appointed Head of the Rates & Canvassing Section, District Goods Manager's Office, Newcastle, in 1932. A year later he became Assistant to the District

Goods & Passenger Manager, Nottingham, and in 1937 was appointed Assistant to the Cartage Manager in London. During 1939-45 Mr. Thomas served with H.M. Forces. He went overseas in 1939 with No. 1 Docks Group, and later was with the Docks Directorate, and in 1942 commanded No. 1 Docks Group in North Africa. A year afterwards he was promoted Colonel on the Movements Staff. In 1944 he became Deputy-Director of the Transportation branch at Allied Commission headquarters in Italy. Since his return to the L.N.E.R. in 1945 he has been Assistant District Goods Manager, Leeds.

Mr. Noel F. Hall has been appointed the first Principal of the Administrative Staff College.

We regret to record the death on August 22, at the age of 80, of Colonel Sir Thomas Polson, K.B.E., C.M.G., T.D., Chairman of Butlin's Limited.

We regret to record the death on August 22, at the age of 72, of Mr. John Bagwell, who was General Manager of the Great Northern Railway (Ireland) from 1911 to 1926.

Mr. J. E. Kitching, who, as recorded in our August 16 issue, retired on July 31 from the position of Mineral Manager (Southern Area), L.N.E.R., entered the service of the North Eastern Railway in the Chief Goods Manager's Department in 1908, and also spent some time in the Divisional Goods Manager's Office at Hull. In 1911 he became head of the Canvassing Section at York, and a year later was transferred to the General Manager's Office on special work in connection with the completion of the King George Dock, Hull. Mr. Kitching was appointed Assistant District Goods Manager, Newcastle-on-Tyne, in 1914, but on the outbreak of war he left that position on being granted a commission in the 17th Northumberland Fusiliers. In 1916 he was transferred to the Docks Directorate, and served at Dunkirk and Havre. On demobilisation in 1919 he entered the Development Department of the Ministry of Transport. Mr. Kitching rejoined the North Eastern Railway in 1921 and a year later became Dock Superintendent, Tyne Dock, a position he relinquished in 1923 to become District Goods Manager of the L.N.E.R. at Middlesbrough. In 1925-26 Mr. Kitching was relieved of his duties at Middlesbrough and undertook a special mission to Australia and New Zealand to investigate the possibilities of developing trade between those Dominions and the East Coast ports served by the L.N.E.R. In 1928 he transferred to Newcastle-on-Tyne as District Goods Manager, and in 1936 was appointed Portmaster at Grimsby & Immingham. He was appointed Mineral Manager (Southern Area), in October, 1939.

Mr. H. Gatford, late Deputy General Manager, East Indian Railway, as briefly recorded in our August 16 issue, has been appointed by the Secretary of State for the Colonies to carry out an engineering investigation on the Sierra Leone Railway. The railway, opened for traffic in 1898, is of 2 ft. 6 in. gauge, with 315 miles of open lines. The standard maximum curvature is 5 chains, and curvature throughout the system is heavy. On the main line from Freetown to Pendembu, 40.5 per cent. of the line is on curve and curves average 5 a mile. There are many heavy gradients throughout the line; the maximum grade is 1 in 50. There are 114 bridges of 20-feet span and longer. In the Colony area many deep ravines are crossed by steel trestle bridges. The majority of the bridges are capable of carrying a 5-ton axle load only. Operating costs thus are high, as train loads must be restricted to overcome track difficulties. Mr. Gatford will make a survey of the whole line and submit recommendations which it is hoped will minimise curvature and gradient.

We regret to record the death, on August 21, at the age of 62, of Mr. M. G. Tweedie, who was Honorary Secretary of the Institution of Railway Signal Engineers from 1921 until he resigned because of ill-health in 1942. Mr. Tweedie retired from the Signal Department of the Great Western Railway in September, 1939. He was the grandson of J. Dunning, one of the associates of Pease and Stephenson in the construction of the Stockton & Darlington Railway. Mr. Tweedie joined the G.W.R. in the Electric Light Department, and later was transferred to the then newly-formed Electrical Engineering Department at Swindon as an Assistant for Train Lighting. In 1913 he went to the Signal & Telegraph Department at Reading, and after service in France from 1914 to 1919 with the R.E. (Signals) he returned to that department as a Technical Assistant. He retired in 1939 from G.W.R. service and in 1942 from the Honorary Secretaryship of the Institution of Railway Signal Engineers, to which he had been elected in 1921.

Five L.M.S.R. engineering and signalling experts leave for the United States today, August 30, on a two months' tour to study the latest technical developments on American railways. Mr. W. K. Wallace, Chief Civil Engineer, L.M.S.R., will be the senior member of the party, which in addition will comprise Lt.-Colonel H. B. Everard (Engineer-Assistant, Permanent Way), Mr. R. L. McIlmoyle (Engineer-Assistant, Structures), Dr. J. L. Martin (Architect-Assistant), and Mr. H. H. Dyer (Engineer-Assistant, Signal & Telegraph Department).

An Advance Section Signalling Device

(*Concluded from page* 245)

the brush is removed by the guard and it is sent back to the preceding station by the next train. Special wooden crates are used for this purpose and each brush is serially numbered. The non-electrical portion of the brush and mounting is painted signal red.

It should be noted that the photographic illustrations with this article show the ramp with only one plate, and brake vans with only one brush instead of two. At the time the photographs were taken the apparatus was in the experimental stage, and it was hoped to secure electrical contact to the rails through the buffer casting and framework. This was found to be somewhat unreliable, and was abandoned in favour of the double brush and plates. Brushes can be fixed, adjusted and locked in less than one minute.

The idea of attaching a brush to trains may sound primitive, but it must be remembered that track-circuiting is not possible with steel sleepers, and wheel-counting devices are not yet available in India. The device cannot send a false indication due to outside interference, or parts hanging down from the train. Its efficiency varies between 98 and 99 per cent. The cost of each section complete is Rs. 1,835, or £137. The apparatus was designed by the Signal Engineer, Ajmer, and, with the exception of relays, was manufactured in the Signal Workshops there.

SOUTHERN RAILWAY WHARVES INSPECTION.—An inspection of the Thames wharves of the Southern Railway was made recently by Colonel Eric Gore Browne, Chairman of the company, Sir Eustace J. Missenden, General Manager, and other officers when, instead of going by train as usual, the party travelled by boat. Mr. F. W. Tipton, Managing Director of the Thames Steam Tug & Lighterage Co. Ltd., and his Assistant, Mr. E. H. Gwynn, provided the diesel-electric tug *Robertsbridge* for the purpose, and the wharves visited covered Battersea, Nine Elms, Blackfriars, Deptford, Angerstein, and Gravesend.

Southern Railway Wharves Inspection

Sir Eustace Missenden, General Manager, Southern Railway, pointing out an incident on the river at Nine Elms to Captain Jeffries, Marine Assistant to the Docks & Marine Manager

Ministry of Transport Accident Report

Potters Bar, L.N.E.R. : February 10, 1946

LT.-COLONEL SIR ALAN MOUNT, C.B., C.B.E., Chief Inspecting Officer of Railways, inquired into the accidents which occurred on February 10, 1946, at Potters Bar, L.N.E.R. The 9.32 p.m. slow passenger train, Hatfield to Kings Cross, composed of two quadruple sets of articulated stock drawn by 0-6-2 tank engine No. 2679, was approaching on the up slow line, when facing-points were reversed between the bogies of the first coach. The engine collided with the buffer stop of the dead end in line with the up slow road, but the train followed the crossover, slow to main. The first two coaches were forced foul of the down main, and the 9.45 p.m. express, Kings Cross to Edinburgh, travelling at 45 m.p.h. under clear signals and composed of 12 bogie vehicles hauled by 2-6-2 engine No. 4876, collided with them and carried the under-frame of the second along for 115 yd. The engine was derailed and considerably damaged.

The 5 p.m. up express, Bradford to Kings Cross, formed of 10 coaches hauled by 2-6-2 engine No. 4833, collided at slow speed with the wreckage so caused, and the engine and tender turned over. The plan on page 251 shows the positions of the engines and vehicles of the three trains after the last collision; the derailed ones are hatched. It was a matter of some difficulty to arrive at the times when the collisions occurred, but the report estimates them as about 10.8½, 10.9½, and 10.9¾ p.m. It was a clear night.

Two passengers in the local train from Hatfield were killed, and 11 others, with six of the company's servants, were injured or suffered from shock. Three were detained in hospital more than a week. Medical aid was quickly available. Down main and slow lines were re-opened at 6.55 p.m. the next day, and the up lines at 12.5 a.m. and 2 a.m. on February 12. There was a good deal of damage to track and signal equipment.

Position of Signals

An independent witness, informed by another of the buffer stop collision, noticed that both the down main and down main to slow starting signals were "off" and the post leaning over. They went to release the signals and the down express arrived, not more than a minute, it was thought, after that collision.

A lineman walking northwards on the footpath (see plan) noticed up main and slow home signals, 15 and 12, at danger behind the Hatfield train. He saw the up express approach, and stop, and said that passengers got out and ran across the down main, after which he heard a grinding noise and saw a black object near the up express engine, which turned over. The report says, however, that this impression is discounted by other evidence and emphasises the contradictory nature of the statements heard from witnesses.

The lines are track-circuited throughout for some distance, except between signals 12/15 and 16. (This gap has since been closed.) Operation is by train-describing bell from the adjacent signal boxes, Marshmoor to the north, and Greenwood to the south. The former controls a crossover, slow to main, south of Brookman's Park Station, where there are colour-light signals, that on the main acting as outer distant for Potters Bar. In rear of these there are colour-light distants. A feature of the case was that, in addition to the up starting signals, six others were held in the clear position by debris on the wires, with the levers normal in the box.

The Course of Events

The driver of the local train said he was running at about 35 to 40 m.p.h. at the Potters Bar distants, Nos. 13 and 10, and expected to run into the platform as usual and stop there. He knew the road and the changes in working made not long before. The outer home was "off" for him and he was sure the inner home, No. 12, was also. He was supported in this by his fireman. He had been checked at Marshmoor box itself, but had found the distant for the intermediate signal beyond Brookman's Park at green. He and his fireman fell down when their engine struck the buffer stops at some 15 m.p.h. and pushed them back. The down express collided with the coaches a minute or two later.

The signalman at Potters Bar said that he did not pull off the outer home, No. 11, until the indicator of the track circuit which begins 200 yd. in rear showed the local train to be arriving; it was his intention to bring it forward to No. 12. On observing that this latter signal was being overrun, he sent "obstruction danger" in both directions, put the up main signals to danger—which he had cleared at 10.7 p.m. for the express from Bradford—and then the down signals, cleared for the Edinburgh train at 10.5 p.m. He then decided to reverse No. 7 crossover to prevent the local from running into the stops. He noticed nothing abnormal when pulling the lever. The engine ran into the buffers at 10.8 p.m.

The down express was just on the up side of the inner home, No. 57, and ran through at some 40 m.p.h. After hearing the crunch that followed, he reported to Control. He saw and heard nothing of the up express. He stated emphatically that he sent "obstruction danger" before any collision had occurred. Some of his evidence regarding the times of the various events was uncertain and contradictory. He had entered the time of arrival of the down express (and the second collision) as 10.8 p.m., but he had previously entered 10.10 p.m., which he said must have been a mistake, as the right figure, 10.8, was written above it. Another uncertain feature in the case was the stopping of the signal box clock at 10.10½ p.m. and the somewhat peculiar evidence given to account for it, while there was room for doubting the evidence given regarding the time of telephoning to the controller.

The evidence of the signalman at the Greenwood box did not make things easier to follow, and it cast serious doubt upon the accuracy of that given by Potters Bar. This man gave the time of passing of the down express as 10.7 p.m. (due at Potters Bar at, say, 10.10) and said "obstruction danger" was received at 10.11. He put down detonators and stopped the 9.55 p.m. express, Kings Cross to Edinburgh. He was rung up from Potters Bar and asked at what time "obstruction danger" was transmitted. As a result of the conversation he altered his record to read 10.8, but later restored his original figure of 10.11.

The evidence given by the driver of the down express supported the statements made by the Greenwood signalman. He was taken by surprise and was running under clear signals. He estimated the time of collision as 10.10 p.m. and thought the up express must have arrived as he was on the point of stopping, and that he was still on the engine when it did so. He did not see the other locomotive until after he had got down and been to see whether anyone was hurt in certain of the coaches. It was then that he found the other engine lying on its side.

His fireman supported his evidence, but could not say anything regarding the up express. The guard noticed no fall in the vacuum until after he had been thrown down three times by jolting.

The woman guard of the local train said they left Brookman's Park at 10.6 p.m. She alighted when the train stopped, and hearing the up main-line train approaching, ran towards it with a red hand signal. She thought the brakes were being applied as it passed her.

The driver of the up express said he approached under clear signals. When at the outer home he saw a red light being waved and the inner home go to danger. He made every effort to stop and was in the act of reversing when he collided with the wreckage at 5 to 10 m.p.h. Later the signalman told him that the local train had overrun signals. He felt positive he saw the inner home go to danger after seeing the red hand lamp. He thought at first that he might have knocked someone down. He found the slow distant "on," the main distant "off," both outer homes "off," and the slow inner home "on" and the main one "off." He did not know that there was a train on the slow line. (The slow outer home was "off" in consequence of the wire being dragged by the displaced buffer stops. Later the main outer home was seen to have been falsely cleared by debris.)

The guard saw no signals, but had no doubt the train was still moving when the collision occurred at approximately 10.12 p.m. by his watch, a good one. (The driver said that the guard's record, which he saw when travelling home, was marked 10.10.)

Telephone Conversations

In his evidence, the signalman at Marshmoor box was inclined to be evasive regarding his telephone conversations with Potters Bar, and he also had altered his original entry regarding the time of receipt of "obstruction danger." At 9.55 p.m. Potters Bar asked where the up express was which preceded the one involved in the collisions, stating he would run the 7.15 p.m. ordinary train from Peterborough behind it. No other conversation took place regarding the order of running of the trains. Generally the Marshmoor register appeared to be reliable and consistent, and the signalman's statements are accepted as being substantially truthful, so far as his memory served him.

He agreed that he telephoned to Potters Bar when the express from Bradford passed at 10.6 p.m. and—according to the man there—commented on its speed. He was indefinite as to his reasons for making this call and thought it might have been to suggest that this train should be allowed to precede the local from Hatfield. (The man at Potters Bar, however, emphatically denied that he ever had any idea of sending the local ahead first, as this would have delayed the express.)

The Marshmoor signalman further said that he cleared his signals for the local after the ordinary from Peterborough had cleared the track circuits concerned (the clearing of the intermediate signals for it

proved the track clear up to No. 12 signal at Potters Bar and the relative signals there returned to normal.) He telephoned in order to co-operate with Potters Bar and warn the signalman there, in the absence of previous advice from Hitchin, as to running of the expresses. The man at Potters Bar said, however, that he received an advice from Hitchin at 9.45 p.m. and remarked that "these express trains have running times between Hitchin and Potters Bar, and that is what we go by unless we telephone Hatfield or Marshmoor."

Marshmoor recorded "obstruction danger" as received at 10.9 p.m., but altered it to 10.7 after being telephoned to at 10.8 with the news about the down express having run into the local. The later time "was put down in mistake" said the signalman; "it probably was not booked at the time it was sent and it must have been booked afterwards . . . I received the six bells at 10.7 p.m. That was the time on the clock, and when I got to the book to put it in I must have looked at the clock again and saw it was 10.9 p.m. and thought again and altered it."

Chief Inspecting Officer's Conclusion

In an extraordinary series of collisions such as this, at night, it is unlikely that the various witnesses would agree on all material points. Evidence as to the times of certain incidents left room for doubt as to the facts. It was disconcerting to find that two signalmen had altered their records, after telephone conversations, even by as much as two minutes earlier, for the time of the down express collision and the giving of "obstruction danger."

About this time, too, the other signalman was questioned by Potters Bar as regards that bell signal, and he changed his entry, but subsequently adhered to his original booking. Although the Potters Bar man emphasised that he transmitted it in both directions at the same time, not later than, say, 10.7½ p.m., before the collision with the buffer stops, and contended that the second collision of the down express took place immediately afterwards, there was no confirmation of this except from the Marshmoor signalman, whose booking was open to doubt in this respect. These and other considerations led Sir Alan Mount to believe that the second collision might have occurred nearer to 10.11 than 10.8, as suggested by the signalman at Potters Bar, and stop watch tests were carried out with trains similar to those in question, in order to make as accurate an assessment as possible of the actual running.

The report reviews at length implications of the evidence given by the driver of the Hatfield train concerning the signal indications, especially his assertion that No. 12 was "off" all the while he was running up to it from No. 11, which was also clear when he first saw it: together with the assertions made by the Potters Bar signalman to the effect that the main line signals were "off" as that train approached, that he noticed No. 12 was being overrun, and fearing a collision with the buffers, first transmitted "obstruction danger," placed the up and then the down signals "on," and then attempted the diversion over points 7. He strongly denied the suggestion that he had cleared No. 12 as well as No. 11, following the passage of the train from Peterborough, and then decided to give the express precedence. He affirmed definitely that he had not left points 7 reversed behind the Peterborough train.

Sir Alan plots in detail the probable

The Potters Bar Accident, L.N.E.R.—Plan of Section Involved

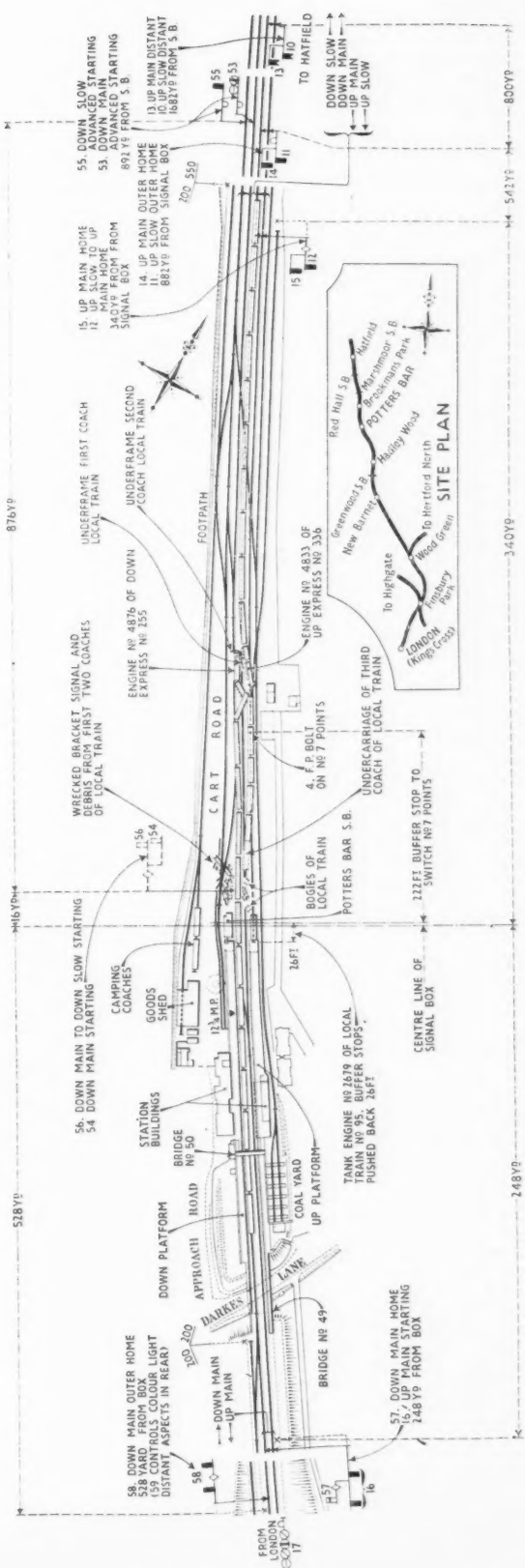


Diagram showing the principal features involved in the accident at Potters Bar on February 10, and referred to in the text of the Inspecting Officer's report

timings of the up Hatfield and Bradford trains from Marshmoor box onwards, taking the register entries at the various boxes, including New Barnet and Greenwood for down movements, as a basis, and making every allowance for clock variations and the probabilities as to the accuracy of the records in each case. He arrives finally at the conclusion that the derailment and buffer stop collision occurred at about 10.8½ p.m.; and the two other collisions at 10.9½ and 10.9¾. It is even possible, he thinks, that the two express engines made contact and came to a stand simultaneously, one glancing off the other and rolling over. It is evident that the up express had *not* stopped *before* the down collided with it. No responsibility is attached to the enginemen of the down express, and their statement that they saw no adverse signals is accepted.

The signalman at Potters Bar declared that he took no steps of an emergency nature until after the Hatfield train had overrun No. 12 signal. It is very doubtful if at that time (before the buffer stop collision) he would have expected the down line to be fouled as well as the up. He dealt with the up line first, as was natural, and transmitted "obstruction danger" to Greenwood box, as he was passing along to replace the down line signals.

Even if he acted for the down line as rapidly as he said he did for the up, he might have been 20 sec. in making the necessary movements—some 14 in all—and although he said he reversed points 7 after doing so, Sir Alan is very doubtful about it, feeling that he most likely pulled 7 directly the locking permitted it and dealt with the down line signals only after realising that the attempt to divert the local train had proved abortive.

There were discrepancies between the evidence given by the driver of the up express—a reliable and straightforward witness—and that given by the local train driver, as regards the signal indications, and a review of all the possibilities involved led to the conclusion that the evidence of the latter driver regarding signal No. 12 was open to question.

Assuming the evidence of the Potters Bar signalman to be uncertain, having regard to contradictions, there is the possibility to consider that, having cleared Nos. 11 and 12—possibly 16 and 17—he decided, on hearing how it was running, to give the express precedence, found he had misled the local train driver and attempted the diversion at the last moment. If the latter's evidence is valid the reversal must have been attempted *after* 10.8 p.m., and a test showed the movements involved to take 14 sec., which contradicts the evidence of the driver of the up express. To effect derailment by pulling lever 7 would involve movements consuming 8 seconds and have left no time at all for the main-line signals to have been "off." The derailment also would probably have taken place at the rear end of the Hatfield train.

Sir Alan was driven to conclude that the driver of that train mistook the main line signal No. 15 as applying to the slow line (this and the adjacent signal are not so well sited with respect to the lines concerned as are Nos. 14 and 11). He accepts the driver's statement that No. 11 was "off" when it came into his view and considers that this may have misled him, while he may not have known the road as well as he assumed he did.

The signalman probably cleared that signal earlier than he intended, *before* the track circuit immediately in rear was occupied. The fairest comment on the signalman's attempt to divert the Hatfield train is to regard it as the result of mistaken zeal. There was no reason, in respect of time, why the train should not have been stopped at No. 11, but he had to make up his mind quickly when he realised that No. 12 was being overrun. Nevertheless, Sir Alan, after watching the working in the Potters Bar box, found it difficult to understand his action, in the conditions obtaining. If he was "not clear as to the actual position of the Hatfield train" and yet thought he had "a reasonable chance of making the lever movement" he was taking unjustifiable risk in respect of the up express. He ought to have left the train to collide with the buffer stops and could not have been expected to do more than replace the signals and transmit the necessary bell signals.

"On the other hand," says the report, "the position was such that he can rightly claim, after the event, that had he pulled lever No. 7 a few seconds earlier the Hatfield train would have been successfully diverted, and the up express would have been stopped before colliding with it, and the down express would not have been involved in any risk at all. His age is 64 and he has a good record."

Remarks and Recommendations

Advice of running of up trains.—The signalman at Marshmoor (who operates the facing crossover at Brookmans Park) does not receive the same information from Hitchin as does the signalman at Potters Bar. The latter is, of course, in control, and the additional information at Marshmoor (mainly a block post) has not been thought necessary. It should be considered whether this might not facilitate co-operation and efficiency, and perhaps avoid uncertainty or last minute change of mind as regards sequence, particularly when trains are running late and out of course. In view of the tunnels ahead, the sequence accorded here has an important bearing on time of arrival at Kings Cross.

Track Circuiting.—The position of the inner home signal No. 12, 265 yd. in rear of facing points No. 7, clearly had a bearing on the derailment of the Hatfield train. Before pulling lever 7 the signalman had to operate bolt lever No. 4 which also actuates the 40-ft. bar. Even if intermediate bars had existed, they would have been of no avail if the signal was passed at danger and if the bolt had been withdrawn before the train reached the first bar.

Even track circuiting, since provided between Nos. 12 and 15, and the starting signal, No. 16, would not have had the desired effect in the circumstances which apparently prevailed, namely, the passing of No. 12 at danger. Conditions, however, have been improved, in that this track circuiting, when occupied, locks levers 12 and 15 normal, and approach back-locks them when the signals are clear; the latter function ensures (subject to the usual time release) that points 7 cannot be moved while the train occupies this track circuiting. But no lock is thereby applied on the points, either normal or reverse, if the signal levers have not been pulled. The company should be asked to consider, in view of the exceptional circumstances (which include shunting movements), whether it would not be justifiable to arrange that occupation of the track circuit, or a portion of it, should make it impossible for these facing points to be shifted while any movement, authorised or otherwise, is traversing them.

As regards the track circuit in rear of No. 12, which extended to a point 200 yd. in rear of No. 11, in view of the special circumstances of this layout, consideration should be given to preventing the premature pulling of No. 11 until the track circuit is occupied, if No. 12 is at danger. This may involve splitting it, but in any case it appears that occupation between Nos. 11 and 12 should back-lock the latter lever once that signal has been cleared, thus ensuring (subject to the usual time release) that facing points No. 7 are held while the train approaches No. 12, even if the signal is reversed in emergency.

Re-siting of inner homes.—These signals have been in their present position for many years, but the circumstances of this accident merit consideration of their location. At present, the main-line signal, No. 15, may well be read to apply to the slow line.

Reconstruction of Station.—What is chiefly wanted, however, is the reconstruction of this old station with two island platforms serving four running lines. This has been under consideration for some years, and, but for the war, the works, which include the rebuilding of the bridge, might have been carried out. Irrespective, therefore, of further widenings which may be necessitated by the Greater London Plan, and having regard to the nature and speed of the traffic, early steps should be taken to carry out this reconstruction. As a commencement, the up slow should be extended, and, if only for convenience in working, the provision by this means of an up island platform appears to be a matter of considerable urgency.

Model Engineer Exhibition

The Model Engineer Exhibition is being held at the New Royal Horticultural Hall, Westminster, S.W.1, until August 31, between 11 a.m. to 9 p.m. daily. It is the 21st exhibition of its kind, the last of which was held in 1938. The exhibition ir organised jointly by Percival Marshall & Co. Ltd., the Society of Model & Experimental Engineers, and the Society of Model Aeronautical Engineers.

Model railway exhibits are a prominent feature of the exhibition, and the competition section includes a collection of over 270 models of all kinds. These models are all made by private hobbyists in home workshops; no trade or professional work is accepted. The various classes include locomotives, marine, and stationary engines, tools, clocks, agricultural machinery, steam and sailing ships and aircraft models. Several steam locomotives are capable of hauling 10 or 12 passengers. At the other extreme in size is a miniature working steam engine which can be housed in a thimble.

Among the many fine locomotive models may be mentioned a 4-6-4+4-6-4 Beyer-Garratt of the Rhodesian Railways locomotive, made by Bassett-Lowke, the 1 in. scale free lance design 4-6-0 by Mr. S. T. Harris, awarded the Championship Cup, and Mr. P. G. Rose's G.W.R. Dean 4-2-2 and *King George VI.* L.M.S.R. Pacifics were popular with modellers; examples included Mr. G. R. Hill's ½-in. scale model and Mr. C. H. Comelli's unfinished model. Mr. F. Willoughby lent a fine model of a S.E.R. 2-2-2 tank. A notable exhibit was the splendid working model escalator, the work of Mr. H. Fenn. Tramways were represented by several excellent models of London Transport cars, built by members of the Tramway & Light Railway Society, and there were numerous models of passenger and commercial road vehicles past and present.

Clerical Staff Training Centre, L.N.E.R.

At one time a boarding school for girls, St. Ronans, Hadley Wood, Herts., has been transformed by the L.N.E.R. into a permanent residential centre for training its Southern Area staff in goods and passenger station work and accounts, and in every type of telecommunication used in the operation of a railway system.

This centre, which was opened formally by Sir Ronald W. Matthews, Chairman of the Company, on August 22, replaces the temporary centres set up during the war for the intensive training of the clerical staff taking the places of men called to the services; it has accommodation for 24 students. For some time to come the majority of the students will be ex-servicemen and women undergoing refresher courses.

At the present time 20 male students are taking the course in station practice, each of which lasts two weeks, and there are four girl students taking the telecommunication course, the length of which depends on the speed at which individual proficiency is attained. By arrangement with St. Dunstan's a special unit has been incorporated for training blind operators.

The Senior Instructor, Mr. E. S. Hobbs, has had considerable practical and teaching experience, and Miss Forsyth, Telecommunication Instructor, was the first trained teleprinter operator on the L.N.E.R. Miss Vicary, Resident Lady Supervisor, is in charge of welfare, and domestic management and catering are in the hands of the L.N.E.R. Hotels Department.

In a short speech to the visitors and students, Sir Ronald Matthews, who was introduced by Mr. M. A. Cameron, Assistant Passenger Manager, first referred to the temporary training schools set up during the war, which had served a useful purpose in providing intensive training for men and women with no previous experience of railway work. Those years of improvisation had shown the importance of practical work in training, and at this new school, which was the first railway school of its kind and was intended for those who already had a sound basis of knowledge of their work, students would find a great deal of emphasis laid on practical instruction.

The residential school, continued the Chairman, possessed certain advantages, not least of which was the opportunity for informal discussion among students and with the instructors. It was a matter for satisfaction, too, that this centre had been adapted to its present purpose and equipped entirely by L.N.E.R. staff. He hoped that in years to come, those who had passed through St. Ronans would look back on that period with satisfaction, and in wishing the students success in their careers, he would remind them: "There is always more room at the top of the ladder than at the bottom."

Others present at the opening ceremony included:—

Messrs. V. M. Barrington-Ward (Divisional General Manager, Southern Area), A. A. Harrison (Assistant Goods Manager, Southern Area), A. E. Tattersall (Assistant Chief Engineer, Signals), A. Moss (Assistant to Engineer, Signals), H. S. Davies (District Engineer, Kings Cross), G. Dow (Press Relations Officer), A. J. White (Advertising Manager), F. H. Colebrook (Purchasing Agent, Kings Cross), A. A. Ryan (Hotels Superintendent, Liverpool Street), and A. G. Smith (Electrical Engineer, London).

STREAM-LINE FILTERS LIMITED.—The net trading profit for 1945 was £52,385, comparing with £29,949 in 1944. Interim dividends of 3 per cent. and 10 per cent. have already been paid, and the directors propose carrying forward £15,471, comparing with £16,916 brought in.

St. Ronans Staff Training Centre, L.N.E.R.

Sir Ronald W. Matthews, Chairman, L.N.E.R., watching girl students at work on a demonstration switchboard

Conversion of Locomotives to Oil Burning

The Minister of Transport, Mr. Alfred Barnes, M.P., has authorised the main-line railway companies to proceed as quickly as possible with the conversion of locomotives from coal to oil; the number involved is 1,217. The programme will give a saving of coal estimated at 20,000 tons per week or 1,000,000 a year.

The numbers of engines to be converted by the individual companies are:—

G.W.R.	172	L.M.S.R.	485
L.N.E.R.	450	S.R.	110

Only heavy-duty locomotives which consume the largest amount of fuel will be selected for conversion. It will be necessary to operate them from depots where fuel storage tanks will be installed.

The three main features of the scheme are the equipment to be fitted to the locomotives, storage installations in the locomotive depots and tank wagons for transporting the oil from ports to depots.

The Ministry of Supply has given every possible assistance in the provision of the material necessary for equipment and storage tanks. A considerable tonnage of steel will be required and complete standardisation of some of the parts is impossible owing to the fact that different types of engines are involved. Each of the main-line railways will carry out its own work of conversion.

No difficulty is expected in obtaining the required number of tank wagons for transporting the oil, but they will require to be fitted with steam-heating coils to keep the fuel fluid.

For more than a year, the G.W.R. has carried out valuable research work in the use of oil fuel for locomotives and is now operating a number of oil-fired engines for both passengers and goods trains, with successful results. The experience gained will be invaluable to the engineers of other companies in their joint effort to save coal.

We understand that the engines it is hoped to convert are :—

	Class of Engine	No
G.W.R.	28xx	63
	49xx	84
	Castle	25
L.N.E.R.	04	112
	01	39
	W.D. Austerity	111
	2-6-0 K3	91
	0-8-0 Q6	46
	0-6-0 J39	35
	02	16
L.M.S.R.	Garratt	33
	0-8-0 Class 7	175
	2-8-0 Class 8	266
	2-8-0 S. & D.	11
S.R.	West Country	20
	N15 & H15	16
	N. & U.	34
	D15	10
	L11. T9	30

Consideration is being given to the installation of storage depots at:—

G.W.R.: Old Oak Common, Reading, Didcot, Swindon, Bristol (Bath Road), Bristol (St. Philips Marsh), Newton Abbot, Plymouth, Severn Tunnel Junction, Ebbw Junction Newton, Cardiff, Landore, Gloucester, Westbury, Banbury.

L.N.E.R.: March, Hansey, Peterborough, Doncaster, Gorton, Mexborough, Darnall, Heaton, Newport Tyneside, Carlisle, St. Margaret's Edinburgh, Cowlairs, Stratford, Darlington.

L.M.S.R.: Cricklewood, Toton, Westhouses, Staveley, Hasland, Carlisle, Leeds, Normanton, Nottingham, Kirkby, Willesden, Bath, Crewe, Wakefield, Farnley Junction, Newton Heath, Aintree, Shrewsbury, Swansea, Wellingborough, Lostock Hall, Northampton, Nuneaton, Rose Grove, Mirfield.

Southern Railway: Eastleigh, Fratton, Exmouth Junction.

Notes and News

Senior Draughtsman Required.—A senior draughtsman is required by the Hunslet Engine Co. Ltd., Leeds. One with locomotive experience preferred, but not essential. See Official Notices on page 255.

London Transport Publicity Officer.—The London Passenger Transport Board invites applications for the post of Publicity Officer. Applicants must not be more than 45 years of age, and have had wide experience of publicity work. See Official Notices, page 255.

London Transport Senior Staff Department Assistant.—The London Passenger Transport Board is inviting applications for the post of Senior Assistant in the Staff Department for general duties in connection with staff policy and administration. Applicants must not be more than 45 years of age, and must have had experience in staff administration in a large organisation. See Official Notices, page 255.

Assistant Accountant Required.—An assistant accountant is required by the Nigerian Government Railway for one tour of 18 to 24 months with possible permanency. Candidates, not over 32, must have matriculated and have had suitable accounting experience or should be associate members of one of the recognised appropriate professional bodies. See Official Notices on page 255.

Minister of Transport Visits Carlisle L.M.S.R. Hostel.—The Minister of Transport, the Rt. Hon. Alfred Barnes, M.P., on August 18 inspected the L.M.S.R. hostel for enginemen and guards at Kingsmoor, Carlisle, which was completed in 1943 and which is one of 43 hostels, with aggregate accommodation of more than 2,050 beds, throughout the L.M.S.R. system. Mr. Barnes, who was conducted round the hostel by Lt.-Colonel H. Rudgard, O.B.E., Superintendent of Motive Power, L.M.S.R., talked with a number of the men using the hostel, which in addition to sleeping accommodation for 100, provides a hot-meal service, packed lunches if required, and full facilities for washing and bathing. Over 3,400 men have taken rest at the Kingmoor Hostel during a recent four-week period; all the bed linen and towels are laundered at the company's own laundry at Slateford, near Edinburgh.

G.W.R. (Extension of Time) Order.—The Minister of Transport has made the Great Western Railway (Extension of Time) Order, 1946 (S.R. & O., 1946, No. 1283), extending by two years the time limited for the compulsory acquisition of lands in connection with the construction of certain railways. Copies of the Order may be obtained from the Clerk of Stationery, Ministry of Transport, Berkeley Square House, Berkeley Square, London, W.1, price 1d. (post free, 2d.).

L.M.S.R. "Princess Maud" Returned to Service.—The ss. *Princess Maud* resumed service on the L.M.S.R. Stranraer-Larne route on August 1, after reconditioning by D. & W. Henderson Limited, Meadowside, Glasgow. This vessel was engaged on troop-carrying to France from September, 1939, until June, 1940, when it took part in the evacuation from Dunkirk. Later, the *Princess Maud* was used for conveying troops to and from Northern Ireland, and it was while thus employed that it was machine-gunned by enemy aircraft on February 9, 1941. After withdrawal from the Stranraer-Larne route in November, 1943, the vessel was equipped for special duties in connection with the invasion of Normandy, and did good work on "D" day and subsequently.

New Electric Suburban Sets, Southern Railway.—The Southern Railway is putting into suburban service ten new four-coach electric train sets. Each has three semi-open coaches—two motor and one trailer—with centre gangways, and one trailer coach of the orthodox closed-compartment type. Their general construction follows that of the new six-a-side compartment-type units, described and illustrated in our May 24 issue. Each motor coach is divided by a partition which converts it, in effect, into two saloons with three seats on one side and two seats on the other side of the gangway. The trailer coach is divided by two partitions. The new sets are an experiment to enable the company to assess the popular demand for a suburban coach which will give more standing room. The total seating capacity is 382, as against 420 with the all-compartment type.

Southern Railway (Extension of Time) Order.—The Minister of Transport has made the Southern Railway (Extension of Time) Order, 1946 (S.R. & O., 1946, No. 1284), extending by three years the time limited for the completion of certain railways and widenings; and by two years the time limited for the acquisition of certain

L.M.S.R. International Ambulance Competition

Presentation of Cup by Mr. H. J. Comber, Chief Officer for Labour & Establishment, L.M.S.R., to the Captain of Crewe Machine Shop "B" team. (See news article in last week's issue)

British and Irish Railway Stocks and Shares

Stocks	Highest 1945	Lowest 1945	Prices August 27, 1946	Rise/Fall
G.W.R.				
Cons. Ord.	60⅜	47½	55½	+ ¼
5% Con. Pref. ...	124½	104½	113	− ½
5% Red. Pref. (1950)	107⅜	101½	103½	—
5% Rt. Charge ...	137½	120	128½	—
5% Cons. Guar. ...	135½	117	122½	—
4% Deb.	118	106	115½	—
4½% Deb.	119½	108	116½	—
4½% Deb.	124½	111½	122	—
5% Deb.	138	124	133½	—
2½% Deb.	83	74½	88½	—
L.M.S.R.				
Ord.	33	23¼	27½	+ ¼
4% Pref. (1923) ...	65	50	53	—
4% Pref.	80¾	69½	75	—
5% Red. Pref. (1955)	106½	99½	102½	—
4% Guar.	106½	97	100½	—
4% Deb.	110½	102	107	—
5% Red. Deb. (1952)	110½	103½	106½	—
L.N.E.R.				
5% Pref. Ord. ...	8½	5½	5	—
Def. Ord.	4½	2½	2⅝	—
4% First Pref. ...	62½	49½	51	—
4% Second Pref. ...	33½	24½	26½	+ ¼
5% Red. Pref. (1955)	103	96	99	—
4% First Guar. ...	104½	95	98½	—
4% Second Guar. ...	97	89½	94	—
3% Deb.	91⅞	82¼	92½	+ ½
4% Deb.	109¾	101	107	—
5% Red. Deb. (1947)	103¼	100	100	—
4½% Sinking Fund Red. Deb.	106⅜	103	105½	—
SOUTHERN				
Pref. Ord.	79½	63	70½	+ ½
Def. Ord.	27	20½	20½	+ ½
5% Pref.	124½	104	110½	− ½
5% Red. Pref. (1964)	117	107	109½	—
5% Guar. Pref. ...	135¾	117	122½	—
5% Red. Guar. Pref. (1957)	117	106½	111½	—
4% Deb.	117	104½	112½	− ½
5% Deb.	137	124	131½	—
4% Red. Deb. (1962-67)	112	104½	109½	—
4% Red. Deb. (1970-80)	113½	104	109½	—
FORTH BRIDGE				
4% Deb.	106	103	106	—
4% Guar.	106	101	103	—
L.P.T.B.				
4½ "A"	125	117	125½	—
5% "A"	135	127	134½	—
3% Guar. (1967-72)	100	97½	104	—
5% "B"	125½	115	120½	—
"C"	70	58	60½	+ 1
MERSEY				
Ord.	37	31½	30	—
3% Perp. Pref. ...	72½	68½	73	+ 1
4% Perp. Deb. ...	104½	104	105	—
3% Perp. Deb. ...	84	78½	82½	—
IRELAND*				
BELFAST & C.D.				
Ord.	8⅛	6	7½	—
G. NORTHERN				
Ord.	34	24½	41½	− ½
Pref.	52½	42⅜	60½	− ½
Guar.	80	68	91½	+ ½
Deb.	97½	87½	106	—
IRISH TRANSPORT				
Common	—	—	19/0	+ 3
3% ...eb.	—	—	103¾	+ ⅛

* Latest available quotation

OFFICIAL NOTICES

Locomotive Building Industry in India

TATA LOCOMOTIVE & ENGINEERING CO. LTD.

APPLICATIONS are invited for the post of Manager of a locomotive and boiler building works now being set up at Jamshedpur, Bchar, India.

The post carries full responsibility for the administration of the Workshops and calls for sound experience in heavy engineering or locomotive work, good executive ability and first-hand knowledge of up-to-date production methods.

Applications, which will be treated in strict confidence, should state age, experience and salary expected.—Messrs. Tata Limited, 18, Grosvenor Place, London, S.W.1.

THE Hunslet Engine Co. Ltd., Leeds, are urgently requiring the services of Senior Draughtsmen. Men with Locomotive experience preferred but not essential provided applicants can satisfy requirements. Prospects of continuous work with good working conditions and canteen facilities.—Apply, 125, Jack Lane, Leeds 10.

BRITISH WORK ON PERSIAN RAILWAYS. The achievements and difficulties of the R.Es. during the 15 months in which they laid the foundation for effective aid to Russia. Reprinted from *The Railway Gazette*, February 2 and 16, 1945. *Price* 1*s*. *Post free* 1*s*. 2*d*.

THE "PAGET" LOCOMOTIVE. Hitherto unpublished details of Sir Cecil Paget's heroic experiment. Eight single-acting cylinders with rotary valves. An application of the principles of the Willans central-valve engine to the steam locomotive. By James Clayton, M.B.E., M.I.Mech.E. Reprinted from *The Railway Gazette*, November 2, 1945. *Price* 2*s*. *Post free* 2*s*. 3*d*.

LONDON PASSENGER TRANSPORT BOARD.—Applications are invited for the post of Publicity Officer, responsible for the general publicity of the Board. Applicants, who must not exceed 45 years of age, must have had wide experience of publicity work and have demonstrated their ability to hold a responsible administrative post. Applications from members of the Board's staff will be considered. The commencing salary is £1,250 p.a., plus war wage (at present £72 16s. p.a.). The successful candidate will be required to pass a medical examination. Membership of the Board's contributory superannuation fund is compulsory. Canvassing, either directly or indirectly, will disqualify.—Applications, giving full particulars of education, business experience, professional or other qualifications, and present remuneration and age, should be sent not later than 30th September, 1946, to the Chief Staff and Welfare Officer (reference ER/E.240), London Passenger Transport Board, 55, Broadway, London, S.W.1.

LONDON PASSENGER TRANSPORT BOARD.—Applications are invited for a post as Senior Assistant in the Staff Department for general duties in connection with staff policy and administration. Applicants, who must not exceed 45 years of age, should preferably be graduates. They must have had wide experience of staff administration in a large organisation in regard to all grades of staff, and must possess initiative and judgment of a high order. The commencing salary is £1,000 per annum, plus war wage (at present £72 16s. per annum). The successful candidate will be required to pass a medical examination and to serve satisfactorily a probationary period. Membership of the Board's contributory superannuation fund is compulsory. Canvassing either directly or indirectly, will disqualify.—Applications, giving full particulars of education, business and other experience, professional or other qualifications, and present remuneration and age, should be sent not later than 21st September, 1946, to the Chief Staff and Welfare Officer (reference ER/E.256), London Passenger Transport Board, 55, Broadway, S.W.1.

Crown Agents for the Colonies

COLONIAL GOVERNMENT APPOINTMENTS.

APPLICATIONS from qualified candidates are invited for the following post:—

ASSISTANT ACCOUNTANT required by the Nigerian Government Railway for one tour of 18 to 24 months with possible permanency. Salary: £400, rising to £720 a year. Commencing salary according to war service. On salary of £400 a year local allowance is £60 and separation allowance for married men is between £84 and £204 a year according to dependants. Outfit alowance, £60. Free passages and quarters. Candidates, not over 32, must have matriculated and have had suitable accounting experience or should be associate members of one of the recognised appropriate professional bodies. Preference will be given to candidates who possess a degree in either Economics or Commerce of one of the recognised universities.—Apply at once by letter, stating age, whether married or single, and full particulars of qualifications and experience, to the Crown Agents for the Colonies, 4, Millbank, London, S.W.1, quoting M/N/16797, on both letter and envelope.

SECTIONED PERSPECTIVE VIEW OF LOCOMOTIVE FRONT END. A notable drawing of L.M.S.R. class "7P" 4-6-2 locomotive of the latest type. Reprinted from *The Railway Gazette*, June 15, 1945. *Price* 2*s*. 6*d*. *Post free* 2*s*. 8*d*.

THE RAILWAY SYSTEM OF JAMAICA. A general description of the system and its traffics, with an account of economic problems; the motive power used; and some features of operation. By H. R. Fox, B.Sc., M.Inst.C.E., General Manager, Jamaica Government Railway. Reprinted from *The Railway Gazette*, January 5 and 12, 1945. *Price* 1*s*. *Post free* 1*s*. 2*d*.

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lands. Copies of the Order may be obtained from the Clerk of Stationery, Ministry of Transport, Berkeley Square House, Berkeley Square, London, W.1, price 1d. (post free, 2d.).

Brazilian Loan for Overseas Purchases.—Orders for railway material and equipment to the value of £1,500,000 are to be placed in Great Britain by the Central Railway of Brazil. Orders to the value of $24 million are also to be placed in the United States. This follows the signing by the Brazilian President of a Decree authorising the Banco do Brazil to make a foreign currency loan to the Central Railway for the purpose of purchasing necessary equipment abroad. The loan, which is for 18 years at 5 per cent., is to be spent entirely in the United States and Great Britain.

G.W.R. Birmingham Zonal Scheme Extended.—The Great Western Railway announces that from September 1 its zonal distribution scheme for "smalls" traffic in the Birmingham area will be extended to include Earlswood Lakes, Wednesbury, which at present comes under West Bromwich sub-depot in the scheme, is to become a sub-depot itself. It will have its own main trunk connection with Hockley Station, thereby improving the service for "smalls" traffic to and from that station. The principles of the company's zoning scheme were described in our January 25 issue, and its extension from the Birmingham area to other parts of the country was reported in our July 5 issue.

Exhibition of Machine Tools and Measuring Instruments.—The Coventry Gauge & Tool Co. Ltd. is to present at the University College, Dundee, an exhibition of Matrix products, including measuring instruments, gauges, thread grinders, and special machine tools similar to that held at Coventry earlier this year, and described in our April 12 issue. The exhibition will be opened on Tuesday, September 3, by Lord Westwood, supported by the Lord Provosts of Dundee and Glasgow, and will remain open until Friday, September 13. Many of the exhibits were produced at the company's Brechin Angus factory, which took over the Brechin factory in mid-1939, and developed as a dispersal factory, training local labour under the supervision of keymen from Coventry.

Charles Roberts & Co. Ltd.—Net consolidated profit for the year to March 31 was £95,441, an increase of £21,689. The Directors have declared a final dividend of 12½ per cent., again making 20 per cent. for the year.

Restricted Services through Woodhead Tunnel, L.N.E.R.—Because of relining work in the Woodhead Tunnel, which will occupy six months and necessitate single-line working, the L.N.E.R. announces alterations in the services *via* Manchester and Sheffield, which began on August 26. Some local trains have been cancelled, and goods trains are being diverted. Long-distance trains are little affected, although subject to delay. The 2.50 p.m. Manchester to Cleethorpes and the 8.30 a.m. Cleethorpes to Manchester are cancelled between Manchester and Sheffield except on Saturdays.

Improvements at Sloane Square, London Transport.—London Transport announces that work has begun on a temporary scheme of repairs and improvements to Sloane Square Station, which was badly damaged during the "blitz" in November, 1940, nine months after it had been rebuilt and equipped with escalators leading from a new circulating area and ticket hall direct to the platforms. This new scheme provides for the enlargement of the present very cramped ticket hall and circulating area, the building of fixed staircases direct to the platform in the positions previously occupied by the escalators, making two staircases to each platform, and the provision of an additional exit to the street. The temporary roof-cover over the platforms will be extended. It is not possible at the present time, on account of the scarcity of materials and equipment, to restore the station to the condition in which it was before it suffered air-raid damage.

Institution of Locomotive Engineers.—A general meeting of the Institution of Locomotive Engineers (for the purpose of electing candidates) will be held on September 11 at 5.30 p.m. in the lower hall of the Institution of Mechanical Engineers, Storey's Gate, London, S.W.1. Afterwards, an informal meeting will take place, at which the following subject will be introduced and discussed: "The Future Motive Power of British Railways."

British Industries Fair, 1947.—The first British Industries Fair since 1939 will be held from May 5 to 16 next year at Earl's Court and Olympia, London, and at Castle Bromwich, Birmingham. As in pre-war years, exhibits will be grouped in two main sections, the lighter industries in London and the engineering and hardware at Birmingham. The London section of the Fair is organised by the Export Promotions Department, Board of Trade, 35, Old Queen Street, London, S.W.1, and the engineering and hardware section by the Birmingham Chamber of Commerce, 95, New Street, Birmingham, 2. Special attention will be devoted to the display of United Kingdom products suitable for export, and it is hoped the Fair will attract many buyers from abroad as well as buyers in Britain.

Forthcoming Meetings

September 4 (*Wed.*).—The Permanent Way Institution (Croydon Section), at Ruskin House (Room 13), Wellesley House, West Croydon, 7 p.m. (Section Meeting). "Junction Renewals," by Mr. N. W. Swinnerton.

September 7 (*Sat.*).—The Permanent Way Institution (Manchester & Liverpool Section), London Road Temperance Institute, Southport. "Personal Recording of Technical Information" (lecture), by Mr. W. Hepworth, A.M.Inst.C.E., of Blackburn.

XUM

Railway Stock Market

Because of holiday considerations, business in stock markets has remained light, particularly as international uncertainties also continued to have a restraining influence. British Funds were quietly steady, and generally industrial shares showed firmness with a number of strong features. The increased newsprint supplies advanced newspaper shares, but earlier gains were not fully held because of profit-taking. Colliery shares were again less prominent, attention having continued to centre on iron and steels in view of the good yields and the growing belief that iron and steel nationalisation may be deferred for some time.

Guest Keen 41s., United Steel 26s. 4½d. Thomas & Baldwins 6s. 8d. shares at 12s. 3d., Thos. Firth & John Brown at 49s. 4½d., Colvilles at 25s. 9d. and Hadfields at 26s. 7½d. were among shares to show further gains. A general advance in leading oils, with Shell 98s. 9d. Burmah Oil 71s. 10½d. and Anglo-Iranian 100s. 7½d., was attributed partly to the big plan for conversion of railway locomotives from coal-burning to oil-firing.

There was rather more business in home railway stocks and prices responded with fractional gains. Sentiment appeared to be assisted by the plan for oil-burning locomotives, partly because this scheme has been made possible by the research and enterprise of the railways, particularly the Great Western, which has given considerable attention in the use of oil fuel. It is realised, of course, that this development has no bearing on the question of nationalisation; but on the other hand, home railway stocks generally have continued to reflect the view that because of the pressure of business and other factors, the Government may be forced to "go slow" in respect of its nationalisation schemes. It is still being suggested in the market that in the event of nationalisation, fixed interest bearing stocks, particularly those quoted under par, such as L.N.E.R. second guaranteed, L.M.S.R. senior preference and Southern preferred ordinary, may offer better scope for appreciation in price than the ordinary or equity stocks.

Nevertheless, a good case can also be made out for the view that the latter are well undervalued, assuming fair compensation terms. It should not be overlooked that the fixed rental agreement, which during the war period, worked chiefly to the advantage of the Government, is now proving advantageous to stockholders, and is expected to remain in force until the whole future of the railways has been finally decided. This implies dividends at around last year's rates for the current year and possibly also for 1947.

Compared with a week ago, Great Western ordinary rallied well from 54¾ to 56, but the 5 per cent. preference eased from 113 to 112½, although the guaranteed stock remained at 122; the 4 per cent. debentures were fractionally lower at 114½. Great Western ordinary was favoured because of the railway's important work in connection with oil-fired locomotives and also because it has the best dividend record among home railway ordinary stocks.

L.M.S.R. ordinary has also moved up on balance from 26¾ to 27½, and the senior preference gained a point at 75½, and the 1923 preference was maintained at 53½; the guaranteed stock was again 100½. L.N.E.R. preferred ordinary strengthened to 5½, having attracted a little attention as a low-priced means of acquiring an interest in home rails. L.N.E.R. second preference firmed up from 26¾ to 26½, while the first preference was 51½, compared with 50½ a week ago, the first and second guaranteed kept at 98 and 94 respectively, but the 3 per cent. debentures firmed up to 93.

Southern deferred improved from 19¾ to 20½ in accordance with the general trend, and the preferred ordinary was 71, compared with 70 a week ago; but the 4 per cent. debentures moved slightly lower at 112 and the 5 per cent. preference stock remained at 110½. London Transport "C" stock was less active, but at 60½ was fractionally higher than a week ago.

Argentine railway stocks after small fluctuations on reports regarding the British Mission's talks, gave way rather sharply on suggestions that a temporary deadlock has been reached. There has been very little selling, but buyers were holding off awaiting further news, and prices declined sharply as a result. Compared with a week ago, Buenos Ayres Great Southern has reacted from 13¼ to 12½, the 5 per cent. preference from 29 to 27½ and the 4 per cent. debentures from 72 to 71. Buenos Ayres & Pacific 4 per cent. debentures at 77½ regained part of an earlier decline, and generally the tendency became steadier, although prices were well down on balance. Elsewhere Leopoldina preference stock firmed up to 10¾, and United of Havana 1906 debentures were better at 16½. In other directions, Peru Corporation securities moved back sharply on the capital scheme. Canadian Pacifics were 22¼xd.

Traffic Table and Stock Prices of Overseas and Foreign Railways

	Railways	Miles open	Week ended	Traffic for week: Total this year	Traffic for week: Inc. or dec. compared with 1944/5	No. of Week	Aggregate traffics to date: Totals 1946/7	Aggregate traffics to date: Totals 1945/6	Aggregate traffics to date: Increase or decrease	Shares or Stock	Prices: Highest 1945	Prices: Lowest 1945	Prices: August 27, 1946
				£	£		£	£	£				
South & Central America	Antofagasta	834	18.8.46	31,040	+ 5,780	33	1,057,830	986,050	+ 71,780	Ord. Stk.	12	8¼	10
	Arg. N.E.	753	17.8.46	ps.280,300	+ ps.14,600	7	ps.2,199,500	ps.2,134,700	+ ps.64,800	,,	10	5¼	8
	Bolivar	174	July, 1946	4,264	+ 137	30	30,100	34,402	− 4,302	6 p.c. Deb.	8½	5½	6½
	Brazil	—	—	—	—	—	—	—	—	Bonds	25	17	27
	B.A. Pacific	2,771	17.8.46	ps.2,050,000	− ps. 3,000	7	ps. 14,988,000	ps. 13,861,000	+ ps. 1,127,000	Ord. Stk.	7	5	8
	B.A.G.S.	5,080	17.8.46	ps,3,040,000	+ ps.286,000	7	ps. 23,036,000	ps.21,077,000	+ ps.1,959,000	Ord. Stk.	13⅜	10½	13
	B.A.Western	1,924	17.8.46	ps 1 201,000	+ ps.182,000	7	ps. 8,062,000	ps.7,527,000	+ ps.535,000	,,	12½	9½	15
	Cent. Argentine	3,700	17.8.46	ps.3,011,350	+ ps. 80,150	7	ps. 21,548,885	ps.20,896,250	+ ps. 652,635	,,	9¾	7	9
	Do.	—	—	—	—	—	—	—	—	Dfd.	5	2⅞	6
	Cent. Uruguay	970	17.8.46	33,002	+ 4,594	6	245,426	243,053	+ 2,373	Ord. Stk.	7½	4	8
	Costa Rica	262	May, 1946	32,411	+ 5,206	48	319,231	259,151	+ 60,080	Stk.	16½	13	12
	Dorada	70	June, 1946	35,600	+ 1,820	26	186,275	182,375	+ 3,900	1 Mt. Deb.	103	102	102½
	Entre Rios	808	17.8.46	ps.440,300	+ ps.72,700	7	ps.2,945,500	ps. 2,984,700	− ps. 39,200	Ord. Stk.	7½	4½	6½
	G.W. of Brazil	1,030	17.8.46	23,000	+ 1,300	33	903,500	809,200	+ 94,300	Ord. Stk.	30/−	23/6	22/6
	Inter. Ctl. Amer.	794	June, 1946	$802,902	+ $33,920	25	$5,657,516	$4,730,391	+ $927,125	—	—	—	—
	La Guaira	22½	July, 1946	6,659	+ 298	29	39,698	43,290	− 3,592	5 p.c. Deb.	78	70	58xd
	Leopoldina	1,918	17.8.46	65,129	+ 4,899	33	1,879,356	1,639,345	+ 240,011	Ord. Stk.	4½	3½	3½
	Mexican	483	31.5.46	ps.1,464,000	+ ps.459,100	21	ps.18,661,800	ps.13,441,600	+ ps.5,220,200	Ord. Stk.	¼	¼	¼
	Midland Uruguay	319	July, 1946	18,824	− 906	4	18,824	19,730	− 906	—	—	—	—
	Nitrate	382	15.8.46	7,331	− 488	32	135,362	111,795	+ 23,567	Ord. Sh.	75/6	67/6	77/6
	N.W. of Uruguay	113	July, 1946	4,575	− 1,517	1	—	—	—	—	—	—	—
	Paraguay Cent.	274	16.8.46	£62,236	+ £6,870	7	£420,790	£453,036	− £32,246	Pr.Li.Stk.	79⅞	77	73½
	Peru Corp.	1,059	July, 1946	150,902	+ 16,152	4	150,902	134,750	+ 16,152	Pref.	10⅜	7⅜	13¼
	Salvador	100	May, 1946	£ 123,750	+ £ 11,750	44	£1,517.450	£ 1,420,000	+ £ 97,450	—	—	—	—
	San Paulo	153½	—	—	—	—	—	—	—	Ord. Stk.	60¾	50½	51
	Taltal	156	July, 1946	3,795	+ 2,010	4	3,795	1,785	+ 2,010	Ord. Sh.	17/−	10/6	18/9
	United of Havana	1,301	17.8.46	51,354	+ 7,671	7	379,740	323,194	+ 56,546	Ord. Stk.	3	1	1⅜
	Uruguay Northern	73	July, 1946	1,098	− 834	4	1,098	1,932	− 834	—	—	—	—
Canada	Canadian National	23,535	July, 1946	8,611,250	−1,350,000	27	55,150,500	63,428,500	− 8,278,000	—	—	—	—
	Canadian Pacific	17,037	21.8.46	1,399,500	− 16,500	33	45,095,250	50,512,000	− 5,416,750	Ord. Stk.	24	14⅜	22⅜
Various	Barsi Light†	202	June, 1946	1,893	+ 140	13	73,395	66,652	+ 6,743	Ord. Stk.	131	123	114
	Beira	204	June, 1946	78,908	− 1,361	33	676,166	693,407	− 17,241	—	—	—	—
	Egyptian Delta	607	31.7.46	19,446	+ 1,759	15	201,088	196,080	+ 5,008	Prf. Sh.	10	8½	5
	Manila	—	—	—	—	—	—	—	—	B. Deb.	71	55½	68½
	Mid. of W. Australia	277	June, 1946	16,780	+ 4,914	52	208,969	219,103	− 10,134	Inc. Deb.	97½	85	75
	Nigeria	1,900	June, 1946	441,797	+ 167,749	13	1,120,904	837,609	+ 283,295	—	—	—	—
	Rhodesia	2,445	June, 1946	533,593	+ 10,968	33	4,600,381	4,510,817	+ 89,564	—	—	—	—
	South African	13,323	20.7.46	1,118,629	+ 120,026	14	17,366,886	15,643,463	+ 1,723,423	—	—	—	—
	Victoria	4,774	May, 1946	1,351,280	+ 4,246	—	—	—	—	—	—	—	—

† Receipts are calculated @ 1s. 6d. to the rupee.